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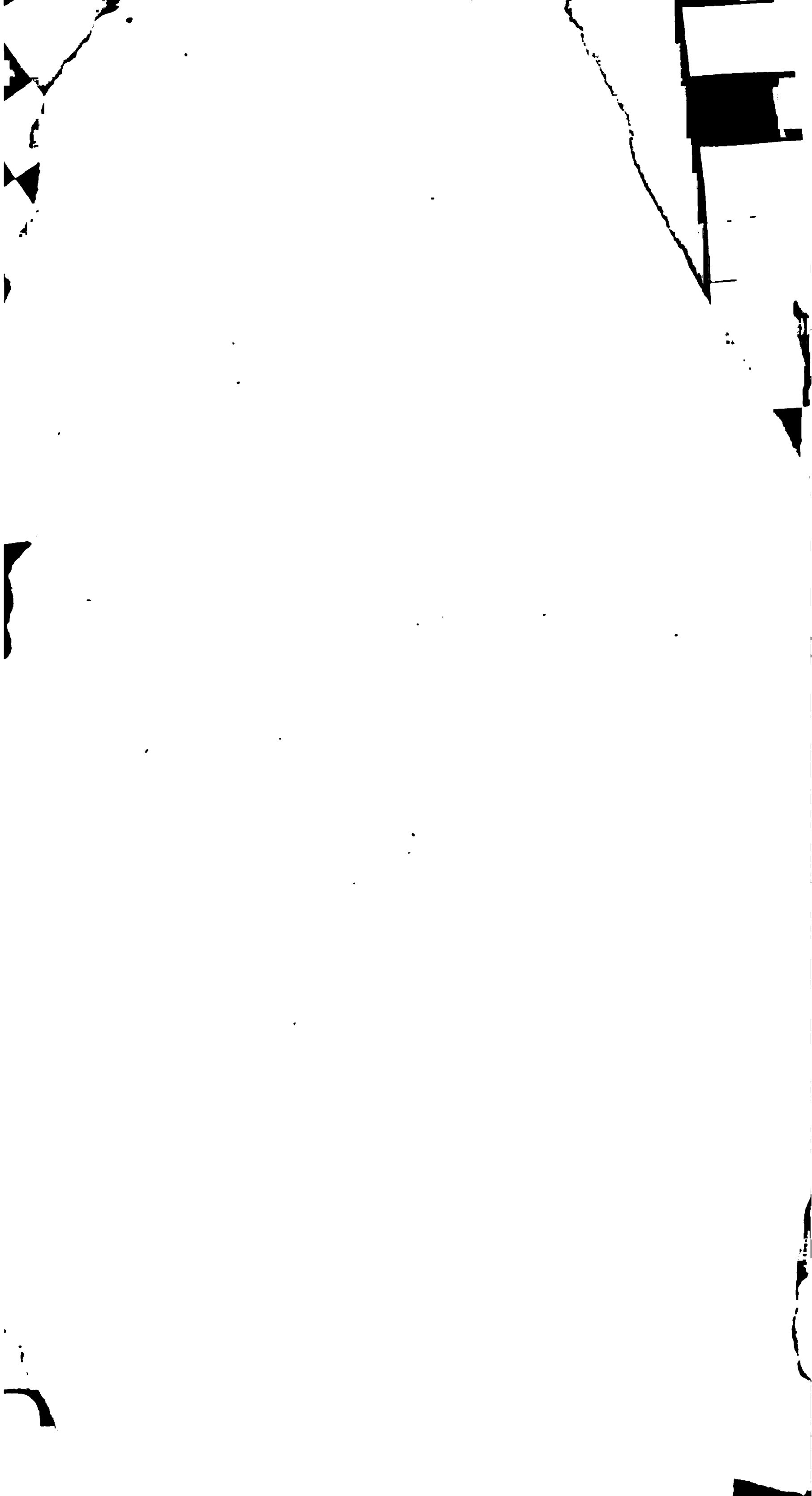
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*1st Session.* } No. 2.

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# ANNUAL REPORTS

OF THE

# WAR DEPARTMENT

FOR THE

FISCAL YEAR ENDED JUNE 30, 1905.

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VOLUME VII.

REPORT OF THE CHIEF OF ENGINEERS.

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WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1905.



# ARRANGEMENT OF THE ANNUAL REPORTS OF THE WAR DEPARTMENT FOR THE YEAR ENDED JUNE 30, 1905.

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- 

<sup>a</sup> Printed in Report of Chief of Engineers, Vol. V.

<sup>b</sup> Printed in Report of Chief of Ordnance, Vol. IX.





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**APPENDIXES**

**TO THE**

**REPORT OF THE CHIEF OF ENGINEERS,**

**UNITED STATES ARMY.**

**(CONTINUED.)**

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## APPENDIX O O.

### IMPROVEMENT OF WATERS CONNECTING THE GREAT LAKES.

**REPORT OF LIEUT. COL. CHAS. E. L. B. DAVIS, CORPS OF ENGINEERS,  
OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905.  
WITH OTHER DOCUMENTS RELATING TO THE WORKS.**

#### IMPROVEMENTS.

- |  |  |
|--|--|
| 1. Ship channel connecting waters of the Great Lakes between Chicago, Duluth, and Buffalo. | 5. St. Clair Flats Canal, Michigan.  |
| 2. St. Marys River at the Falls, Michigan.   | 6. Operating and care of St. Clair Flats Canal, Michigan.                  |
| 3. Operating and care of St. Marys Falls Canal, Michigan.                                  | 7. Detroit River, Michigan.  |
| 4. Hay Lake and Neebish channels, St. Marys River, Michigan.                               | 8. Removing sunken vessels or craft obstructing or endangering navigation. |

#### SURVEYS.

- |  |  |
|--|--|
| 9. Waters connecting Lakes Superior and Huron, including Hay Lake channel, Michigan. | 10. Detroit River from Detroit to Lake Erie. |
|--|--|

#### HARBOR LINES.

11. Detroit River at mouth of Rouge River, Michigan.

UNITED STATES ENGINEER OFFICE,  
*Detroit, Mich., July 20, 1905.*

GENERAL: I have the honor to submit herewith the annual report relative to the works under my charge during the fiscal year ending June 30, 1905.

Very respectfully, your obedient servant,

CHAS. E. L. B. DAVIS,  
*Lieut. Col., Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

## O O I.

### IMPROVEMENT OF SHIP CHANNEL CONNECTING WATERS OF THE GREAT LAKES BETWEEN CHICAGO, DULUTH, AND BUFFALO.

The work in progress is, under the project of 1892, contemplating a navigable depth of 20 feet at mean stage of water by excavating

channels of a minimum width of 300 feet through the shallows of the connecting waters of the Great Lakes between Chicago, Duluth, and Buffalo. The improved channels were made available in 1897, but as the water levels have been almost continuously below the mean stage, the actual navigable depth has been 1 to 3 feet less than 20 feet.

The operations during the past fiscal year were as follows:

*Detroit River and St. Clair River and Lake.*—No dredging was done in the Detroit River under this project during the year. In Lake St. Clair 15,438 cubic yards of sand and clay were removed from the Grosse Pointe Cut and lower approach to the St. Clair Flats Canal under a contract dated August 12, 1903, that was completed November 2, 1904. From the same locality 56,936 cubic yards were removed under contract dated March 28, 1905, which is still in force.

Two dredges excavated 42,856 cubic yards of material from the shoals at the mouth of Black River and foot of Lake Huron under contract dated August 19, 1903, completing their contract on August 17, 1904.

This work is under the local charge of Chief Assistant Engineer E. S. Wheeler.

*St. Marys River.*—Under emergency contract dated April 26, 1904, contractors H. W. Hubbell & Co. removed 80 cubic yards of bowlders from an area 200 by 1,400 feet, resulting in the widening of the angle at Sailors Encampment to an extreme width of 825 feet, with a clear depth of 21 feet below water level of 578.8 feet.

Hydrographic surveys for the purpose of estimating the cost of proposed improvements were made at Round Island Shoal No. 2, shoal off Sweets Point, shoal near Squaw Island, and two shoals at foot of Little Mud Lake.

The St. Marys River work was in charge of Assistant Engineer Joseph Ripley.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$154,242.31
June 30, 1905, amount expended during fiscal year, for works of improvement .....	51,945.09
July 1, 1905, balance unexpended .....	102,297.22
July 1, 1905, outstanding liabilities .....	8,500.00
July 1, 1905, balance available .....	93,797.22
July 1, 1905, amount covered by uncompleted contracts .....	10,780.00

#### APPROPRIATIONS.

July 13, 1892 .....	\$375,000
March 3, 1893, sundry civil act .....	875,000
March 2, 1895, sundry civil act .....	500,000
June 11, 1896, sundry civil act .....	500,000
June 4, 1897, sundry civil act .....	1,090,000
Total .....	3,340,000

## ABSTRACT OF CONTRACTS IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

*Contract dated August 12, 1903.*

Name of contractor: William E. Rooney, Toledo, Ohio.  
Amount and character of work: \$17,410.70; time work by dredging plant.  
Price per unit: \$14 per working hour in Lake St. Clair; \$11.75 per working hour in St. Clair River.  
Date of approval: August 26, 1903.  
Date of beginning of work: September 28, 1903.  
Date of expiration and completion: November 5, 1904.

*Contract dated August 19, 1903.*

Name of contractor: Lake Superior Contracting and Dredging Company, Duluth, Minn.  
Amount and character of work: \$64,004.87; time work by dredging plant.  
Price per unit: \$24 per working hour.  
Date of approval: September 18, 1903.  
Date of beginning of work: November 2, 1903.  
Date of expiration and completion: August 17, 1904.

*Emergency contract dated April 26, 1904.*

Name of contractor: H. W. Hubbell & Co., Saginaw, Mich.  
Amount and character of work: \$4,219.63; hire of steam derrick boat, etc.  
Price per unit: Derrick boat, \$6.15 per working hour; dynamite, 18 cents per pound.  
Date of beginning of work: May 6, 1904.  
Date of expiration: About August 20, 1904; completed August 5, 1904.

*Contract dated March 28, 1905.*

Name of contractor: Lake Superior Contracting and Dredging Company, Duluth, Minn.  
Amount and character of work: \$20,000; time work by dredging plant in Lake St. Clair.  
Price per unit: \$25 per working hour.  
Date of approval: May 5, 1905.  
Date of beginning of work: June 8, 1905.  
Date of expiration: About October 5, 1905.

## REPORT OF MR. E. S. WHEELER, CHIEF ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,  
Detroit, Mich., June 30, 1905.

COLONEL: I have the honor to submit the following report of operations under my charge connected with the improvement of the ship channel connecting the waters of the Great Lakes between Chicago, Duluth, and Buffalo, for the fiscal year ending June 30, 1905:

The dredge *S. Birckhead*, owned by the W. E. Rooney estate, continued time work under contract dated August 12, 1903, until November 2, 1904, when the contract was completed. During the fiscal year this dredge excavated and removed 15,438 cubic yards from the Grosse Pointe Cut, and 33,271 cubic yards from lower entrance of St. Clair Flats Canal, at a total cost of \$9,908.70, or 20.34 cents per cubic yard.

The two dredges, *Port Huron* and *No. 2*, owned by the Lake Superior Contracting and Dredging Company, continued time work under contract dated August 19, 1903, completing the same on August 17, 1904. On July 1, 1904, dredge *Port Huron*, while coming in from Lake Huron shoal for shelter, sunk and did not again resume work, *No. 2* continuing until the completion of the contract on August 17, 1904. During the fiscal year there was excavated and removed 9,038 cubic yards from shoal opposite mouth of Black River, and 33,818 cubic yards from shoal at foot of Lake Huron, at a total cost of \$10,077.68, or 23.51 cents per cubic yard.

Dredge *No. 2*, owned by the Lake Superior Contracting and Dredging Company, commenced work on May 27, 1905, under contract dated March 28, 1905. During

the fiscal year this dredge excavated and removed 56,936 cubic yards from the Grosse Pointe Cut, at a total cost of \$9,255.12, or 16.25 cents per cubic yard. This contract is still in force.

Very respectfully,

E. S. WHEELER,  
*Chief Assistant Engineer.*

Lieut. Col. CHARLES E. L. B. DAVIS,  
*Corps of Engineers.*

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REPORT OF MR. JOSEPH RIPLEY, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,  
*Sault Ste. Marie, Mich., July 1, 1905.*

COLONEL: I have the honor to submit the following report of operations for improving the sections in St. Marys River of the 20 and 21 foot ship channel during the fiscal year ending June 30, 1905:

WIDENING ANGLE AT SAILORS ENCAMPMENT.

*Section 3, item E.*—Location is 22 miles below St. Marys Falls Canal.

Under emergency contract dated April 28, 1904, with H. W. Hubbell & Co., for hire of steam derrick boat at \$6.15 per working hour, the removal of material left above grade by the dredges was completed on July 11, 1904.

The improved areas were swept over with the raft bars suspended at grade of 21 feet for low-water stage of 578.8 and then opened to navigation.

The derrick boat worked 71.7 hours and was delayed 4.1 hours; 17 pounds of dynamite were used for blasting, and 80 cubic yards of bowlders were picked up and removed to the dump pile at a cost of \$443.81. The total cost of widening the additional 200 feet was \$52,397.38, exclusive of engineering and office expenses.

The extreme width of the channel at this angle is now 825 feet. The approved project of 1904 provides for a width of about 1,000 feet, and this will be secured during the coming season by hire of plant by the working hour.

This bend of the river is a particularly dangerous one for navigation on account of the large deflection angle of over 61 degrees from sailing course No. 8 to No. 9, in combination with timbered shores obstructing view of channel approaches, a swift cross current, and rocky banks.

SURVEYS.

In August a survey was made for widening Round Island shoal No. 2, item A, an additional 200 feet on the south side. There were 6,910 soundings taken, 10 by 25 feet apart, over an area 400 by 4,300 feet.

About 2,400 soundings were taken on the Little Mud Lake, Squaw Island, and Sweets Point shoals. The character of the materials in these shoals was determined by borings and by the diver making examinations. Sketch maps of the shoals were duly prepared and computations made to determine amounts of material to be removed for safe draft of 21 feet.

A progress report was made in October of the work completed and that remaining to be done in the St. Marys River sections under the 1902 project.

Very respectfully, your obedient servant,

JOSEPH RIPLEY,  
*Assistant Engineer.*

Lieut. Col. CHAS. E. L. B. DAVIS,  
*Corps of Engineers.*

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O O 2.

IMPROVEMENT OF ST. MARYS RIVER AT THE FALLS, MICHIGAN.

The work now in progress comprises the construction of a movable dam, the acquisition of lands, etc., covered by the project of 1886, and its extensions; also the canal widening and further improvement

authorized by the river and harbor act of June 13, 1902, and provided for by the river and harbor act of March 3, 1905, which appropriated \$420,000 and authorized work to the extent of \$600,000 more for the prosecution of the project submitted in final survey report of December 3, 1904 (H. Doc. No. 215, 58th Cong., 3d sess).

The total expenditures up to June 30, 1905, are \$4,354,066.55, leaving \$829,798.45 available for payment of outstanding liabilities and for further work.

The diversions provided for by the act of June 13, 1902, allowing \$20,000 for special work at Sailors Encampment (already so expended), \$20,000 for an international commission, and about \$85,000 for St. Clair Flats Canal work, as now estimated, will leave about \$723,000 for completion of the 1886 project and for continuing improvement as explained in preliminary report of June 4, 1900, and project of December 3, 1904, already referred to.

The unfinished work of the 1886 project, including movable dam, will require about \$303,000, the purchase of lands about \$90,000 additional; the widening, etc., of the 1904 project will require about \$1,020,000, and the new lock proposed in the same project will require about \$3,300,000, giving a total of \$4,713,000, of which \$723,000 is actually available; \$600,000 has been authorized but remains to be appropriated, leaving \$3,390,000 still unprovided for.

The operations of the past fiscal year were as follows:

Work on the proposed widening of the canal above the locks has been confined to the preparation of plans and surveys for the same, except the excavation of a test pit to show the character of the material, and the raising of the level of the cofferdam surrounding a portion of the site of the widening at points where the natural settlement of the clay filling had rendered this advisable. The actual work of construction must await the acquisition of about 6 acres of land if the entire excavation is to be provided for in one contract, and that is the most advantageous and economical method.

The purchase of lands fronting on the river between the Weitzel lock and the old Fort Brady reservation was continued, \$122,600 being paid for 2.15 acres in five lots. Negotiations are in progress for the purchase of the remaining lands needed.

The studies for movable dam and new lock were continued, and estimates of the weight and time of operation of the various types of movable dams were made.

The commerce passing through the St. Marys River, shown by the statistics of traffic through both the Canadian and American locks at the Sault for the navigation season of 1904, a period of seven months and twenty-seven days, was 31,546,106 tons of freight, valued at \$334,502,686.

The number of passengers reported in transit through the locks was 37,695.

Daily readings of water gauges above and below the locks were made throughout the year and their monthly means and differences computed.

Details of operations are given in the appended report of Assistant Engineer Joseph Ripley, under whose immediate supervision the work has been carried on.



Money statement.

July 1, 1904, balance unexpended .....	\$544, 892. 48
Amount appropriated by river and harbor act approved March 3, 1905..	420, 000. 00
	<hr/> 964, 892. 48
June 30, 1905, amount expended during fiscal year, for works of im- provement.....	<sup>a</sup> 135, 094. 03
	<hr/>
July 1, 1905, balance unexpended .....	829, 798. 45
July 1, 1905, outstanding liabilities and diversions of act of June 13, 1902.	106, 429. 11
	<hr/>
July 1, 1905, balance available .....	723, 369. 34
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	778. 50
	<hr/>
Amount (estimated) required for completion of existing project .....	600, 000. 00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unex- pended July 1, 1905 .....	600, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATIONS.

On past finished projects of 1856 to 1885, \$2,875,692, including \$10,000 diverted from Great Lakes harbors appropriation of 1864. On present project:

August 5, 1886.....	\$250, 000	August 18, 1894, sundry civil	
August 11, 1888.....	1, 000, 000	act .....	\$300, 000
September 19, 1890 .....	900, 000	March 2, 1895, sundry civil act	483, 865
March 3, 1891, sundry civil act	600, 000	March 3, 1905 .....	420, 000
March 3, 1893, sundry civil act	1, 230, 000		<hr/>
		Total .....	5, 183, 865

ABSTRACT OF CONTRACT IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

Emergency contract dated June 30, 1905.

Name of contractor: Municipal Engineering and Contracting Company, Chicago, Ill.

Amount and character of work: \$778.50; furnishing and delivering one concrete mixer and engine.

Price: lump sum of \$778.50.

Date of beginning of work: July 10, 1905.

Date of expiration: July 30, 1905.

REPORT OF MR. JOSEPH RIPLEY, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,  
Sault Ste. Marie, Mich., July 1, 1905.

COLONEL: I have the honor to submit the following report of operations for improving St. Marys River, at the falls, Michigan, during the fiscal year ending June 30, 1905:

<sup>a</sup> Includes payments by Treasury Department, account of Michigan Cen- tral Railroad Company .....	\$12. 52
Duluth, South Shore and Atlantic Railroad Company.....	6. 26
	<hr/> 18. 78

The cofferdam surrounding the site of the proposed excavation for widening the canal above the locks was raised about 3 feet in the places where the clay had settled.

Borings to rock along the cofferdam trench on north side of proposed canal widening were made and platted, to show the profile of rock surface for use in making estimates of cost.

A test pit about 15 feet square and 30 feet deep was excavated near the west end of the cofferdam inclosure, to determine the character of the rock to be excavated and to enable prospective bidders on excavation to more accurately estimate the probable cost of the work.

Observations were continued to determine changes in length and alignment of the Poe lock walls for use in connection with studies for walls of new lock.

A tape comparator for use in standardizing tapes was so far completed as to be of use, and several tapes were compared with a standard tape.

A float gauge, to be read in connection with automatic gauge below the locks, was established in the gauge house and the elevation of the staff gauge at the head of canal was checked by levels from established bench marks.

The self-registering gauges above and below the locks were inspected regularly, the elevations of water surface at hourly intervals were scaled from the rolls and recorded, and the rolls sent to the United States Lake Survey Office for file.

Daily readings of staff gauges above and below the locks of the St. Marys Falls Canal were taken, as usual, throughout the year. The monthly mean elevations referred to the system of levels heretofore in use are as follows:

[Elevation, in feet, above mean tide at New York.]

Month.	Monthly means.		Mean difference.
	Above locks.	Below locks.	
1904.			
July.....	<i>Feet.</i> 602. 368	<i>Feet.</i> 582. 988	<i>Feet.</i> 19. 380
August.....	602. 382	583. 071	19. 311
September.....	602. 524	583. 144	19. 380
October.....	602. 598	583. 142	19. 456
November.....	602. 465	582. 795	19. 670
December.....	602. 067	582. 657	19. 410
1905.			
January.....	601. 72	583. 384	18. 836
February.....	601. 45	583. 637	17. 813
March.....	601. 216	583. 267	17. 949
April.....	601. 576	582. 263	19. 313
May.....	601. 931	582. 413	19. 518
June.....	602. 177	582. 662	19. 515

The changes to aids to navigation in St. Marys River, which were specially reported, related principally to shifting of buoys and float lights in connection with dredging operations of widening and deepening channels.

Suggested changes, so far as concerned St. Marys River, were submitted for use in preparation of Bulletin No. 15, Survey of Northern and Northwestern Lakes.

Negotiations were continued for purchase of lands located north of Water street.

Payment was made by the United States in December, 1904, to George Kemp, James Strachan, Charles R. Miller, Hotton Brothers, and Mrs. M. C. H. Wells of \$122,600, the appraised value of five lots containing 2.15 acres of land. All the dock property along the river frontage between the Weitzel lock and old Fort Brady pier is now owned by the Government. Papers are being prepared for title to remaining 2 acres fronting on Water street, at an approximate cost of \$90,000.

Studies for movable dam were continued, general plans and estimates being prepared for a balanced gate with vertical axis and the weight and probable time of operation of twenty-one types being considered and specially reported.

Studies for new lock were continued, these studies including various plans for filling and emptying the lock, design of gate and valve operating machinery, etc.

Assistant Engineer L. C. Sabin had special charge of this part of the work.

Very respectfully, your obedient servant,

JOSEPH RIPLEY,  
*Assistant Engineer.*

Lieut. Col. CHAS. E. L. B. DAVIS,  
*Corps of Engineers.*

O O 3.

OPERATING AND CARE OF ST. MARYS FALLS CANAL.

This service is provided for from the permanent indefinite appropriation for operating and care of canals and other works of navigation under section 4 of the river and harbor act of July 5, 1884.

The progress of improvement of this waterway is explained under the heading of the improvement of St. Marys River at the falls. (See Appendix O O 2.)

During the fiscal year the canal was open to navigation two hundred and forty-four days, the closed period of one hundred and twenty-one days being from December 14, 1904, to April 13, 1905. During the open period there passed through the canal 34,385,090 tons of freight, an increase of 12,496,032 tons over the tonnage for the fiscal year 1904.

The total delays that occurred in locking vessels amounted to one hundred and eleven hours, of which fifty-five occurred at the Poe lock and fifty-six at the Weitzel lock.

Many minor accidents, resulting in damage to property, occurred, and one of the lockmen had his hand crushed while operating gate engine.

During the closed period of navigation both locks, including all operating machinery, were overhauled and put in complete repair. The superstructure of 316 feet of southwest pier was renewed with concrete.

The report of Mr. Joseph Ripley, general superintendent of the canal, is submitted herewith, to which attention is invited for details of service, repairs, accidents, etc.

The very complete statistics of lake commerce passing through the American and Canadian canals during the season of 1904, compiled from the official records at the St. Marys Falls Canal, are also appended.

The estimated amount required for the year ending June 30, 1906, is \$95,000, to be applied approximately as follows: For pay rolls, \$72,800; for repairs, \$10,700; for general supplies, \$5,500; for electric lighting of buildings, locks, and grounds, \$3,000; and for general contingencies, including office expenses, \$3,000.

*Summary of expenses for operating and care of St. Marys Falls Canal, Michigan, for the fiscal year ending June 30, 1905.*

Pay rolls.....	\$69,830.16
Repair material .....	3,987.90
General supplies .....	6,220.25
Electric lighting .....	2,991.68
Contingencies.....	2,216.36
Total.....	85,246.35

Money statement.

Expenditures to June 30, 1904 .....	\$1,226,381.79
Outstanding liabilities June 30, 1904.....	7,210.82
<hr/>	
Total expenses to June 30, 1904 .....	1,233,592.61
Expended during fiscal year ending June 30, 1905 .....	\$85,422.92
Deduct outstanding liabilities pertaining to preceding year. ....	7,210.82
<hr/>	
	78,212.10
Add outstanding liabilities June 30, 1905 .....	7,034.25
<hr/>	
	85,246.35
<hr/>	
Total expenses to June 30, 1905 (including outstanding liabilities) .	1,318,838.96

Estimate.

Amount (estimated) for fiscal year ending June 30, 1906.....	\$95,000
Balance from allotment for preceding year (in round numbers) .....	9,000
<hr/>	
Additional allotment required for fiscal year ending June 30, 1906.....	86,000

Expenses for operating and cure of St. Marys Falls Canal, Michigan.

1882 .....	\$31,207.48	1895 .....	\$50,908.67
1883 .....	35,509.70	1896 .....	60,763.28
1884 .....	31,212.93	1897 .....	78,104.05
1885 .....	27,242.45	1898 .....	58,890.72
1886 .....	25,400.95	1899 .....	90,307.94
1887 .....	22,138.92	1900 .....	79,293.26
1888 .....	29,898.72	1901 .....	75,475.33
1889 .....	30,749.45	1902 .....	87,693.80
1890 .....	34,323.85	1903 .....	83,876.80
1891 .....	48,330.89	1904 .....	93,248.47
1892 .....	61,389.74	1905 .....	85,246.35
1893 .....	42,412.12	<hr/>	
1894 .....	55,213.09	Total .....	1,318,838.96

Statement of receipts and expenses for fiscal year ending June 30, 1905.

Receipts:	
Balance at close of fiscal year ending June 30, 1904 (including out-	
standing liabilities) .....	\$20,428.54
July 11, 1904, allotment .....	74,000.00
<hr/>	
	94,428.54
Expenses .....	85,246.35
<hr/>	
Balance at close of fiscal year ending June 30, 1905 .....	9,182.19

ABSTRACT OF CONTRACT IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

Emergency contract dated September 13, 1904.

Name of contractor: F. B. Spear & Sons, Marquette, Mich.  
Amount and character of work: \$1,809; furnishing 1,100 barrels Portland cement.  
Price per unit: 600 barrels at \$1.69, and 500 barrels at \$1.59.  
Date of beginning of work: September 14, 1904.  
Date of expiration: October 5, 1904. Completed October 3, 1904.

## COMMERCIAL STATISTICS.

*Statistics of lake commerce passing through the American and Canadian canals at Sault Ste. Marie, Michigan and Ontario, during the season of 1904.*

[Compiled from official records at St. Marys Falls Canal, Michigan.]

## SOURCES OF INFORMATION FOR TRAFFIC DATA AND VALUATIONS.

*Freight tonnage and passengers.*—The freight unit used and designated as a “net ton” means in every instance a ton of 2,000 pounds. The data relative to freight and passengers were compiled from reports made by vessel masters when passing through the American and Canadian canals. As a daily exchange of these reports is made with Superintendent J. C. Boyd, of the Canadian Canal, both offices have record of the entire lake traffic to and from Lake Superior.

*Registered tonnage and vessel valuations.*—The registered tonnage, as given, was obtained from vessel papers and blue books. Vessel valuations were obtained from Inland Lloyd's.

*Freight rates.*—These were compiled from quotations published in the Marine Review, and from information obtained from shippers, owners, and carriers of the several classes of freight. The freight rates given are for lake transportation and include cost of loading and unloading.

*Freight valuations.*—The unit values used for the various items of freight were derived by taking the mean for the season—of each monthly average as obtained from daily or weekly prices current.

The sources of the valuations given are as follows: Coal, quotations in Coal Trade Journal at Duluth and Superior; cereals, Daily Commercial Record, published by Duluth Board of Trade; flour, daily quotations in Duluth, Superior, and Minneapolis journals; iron ore and pig iron, weekly quotations in Iron Trade Review, Marine Review; salt, quotations at Lake Superior ports; copper, general merchandise, lumber, building stone, and manufactured iron, quotations by the principal shippers, owners, and carriers.

To quotations given at point of shipment, freight rates are added to lake ports of destination.

The compilation was done by the clerical force in the United States Canal office at Sault Ste. Marie, Mich., under the supervision of General Superintendent Joseph Ripley.

*American and Canadian canals.*—The total freight traffic of 31,546,106 net tons for the season of 1904, when compared with season of 1903, shows a decrease of 9 per cent, or 3,128,331 tons. This decrease was due partly to the late opening of navigation, but principally to the strike of the Masters and Pilots' Association, which was in force from opening of season to June 13.

The items showing an increase are grain other than wheat, manufactured and pig iron, silver ore, building stone, and general merchandise.

The total number of passengers was 37,695, a decrease of 17,480, or 32 per cent.

The passages through both canals numbered 16,120, showing a loss of 2,476, or 13 per cent, from the 18,596 passages of 1903. The total lockages numbered 10,315, a loss of 1,327 lockages, or 11 per cent.

The season of navigation continued for a period of seven months and twenty-seven days, during which time the average monthly traffic was 3,993,178 tons.

The depth of water in entrance channels and through the canals and locks permitted a safe draft of 17½ to 19½ feet.

*American Canal.*—The traffic through the American Canal was 84 per cent of the total freight and 57 per cent of the passengers carried, the amounts being 26,517,916 tons of freight and 21,606 passengers. Compared with the season of 1903, there was a decrease of 2,654,336 tons of freight, or 9 per cent, and a decrease in passengers of 1,550, or 7 per cent.

The American Canal opened May 5 and closed December 13, 1904, making the length of its season two hundred and twenty-three days.

*Canadian Canal.*—The traffic through the Canadian Canal was 16 per cent of the total freight and 43 per cent of the passengers carried, the amounts being 5,028,190 tons of freight and 16,089 passengers. Compared with the season of 1903, there was a decrease of 473,995 tons, or 9 per cent, and a decrease of 15,930 passengers, or 50 per cent.

The Canadian Canal was opened April 30 and closed December 26, 1904, making the length of its season two hundred and forty-one days.

## GENERAL SUMMARY.

[For American and Canadian canals together.]

Total mile-tons.....	26,608,815,636
Total freight carried.....tons..	31,546,106

Total valuation placed on freight carried.....	\$334, 502, 686
Average value per ton of freight carried.....	\$10. 60
Total amount paid for freight transportation .....	\$21, 552, 894. 30
Average distance freight was carried.....miles..	843. 5
Cost per mile, per ton .....	mill.. . 81
Average cost per ton for freight transportation .....	\$0. 68
Total number of registered vessels using canals .....	886
Total number of passages by unregistered crafts carrying freight....	513
Time American Canal was operated .....	days.. 223
Time Canadian Canal was operated .....	do.... 241
Total valuation placed on registered vessels .....	\$69, 166, 400
Total number of passengers transported.....	37, 695
Freight carried by—	
Registered vessels .....	tons.. 31, 489, 497
Unregistered vessels.....	do.... 56, 609
American vessels .....	per cent.. 94
Canadian vessels .....	do.... 6
Passengers carried by—	
American vessels.....	do.... 37
Canadian vessels .....	do.... 63

CANAL POST-OFFICE.

The American Canal post-office delivered 120,405 pieces of mail during the season, consisting of 107,104 letters, 5,114 postals, 7,586 newspapers, and 601 parcels; also returned 800 pieces to the city post-office after being held thirty days uncalled for, and forwarded 2,410 pieces to new addresses. As compared with last year, this shows a decrease of 26,370 pieces of mail. The carrying, distributing, and delivering of marine mail was done by the office employees in addition to their regular duties of receiving masters' reports and keeping the traffic records.

*East and west bound commerce passing both American and Canadian canals at Sault Ste. Marie, Michigan and Ontario, for the season of 1904.*

EASTBOUND.

Articles.	United States Canal.	Canadian Canal.	Total.
Copper.....net tons..	100, 519	9, 086	109, 605
Grain.....bushels..	27, 877, 079	5, 148, 372	33, 025, 451
Building stone.....net tons..	25, 538	1, 555	27, 093
Flour.....barrels..	2, 774, 803	1, 935, 325	4, 710, 188
Iron ore.....net tons..	17, 207, 260	2, 428, 537	19, 635, 797
Iron, pig.....do....	33, 591	11, 268	44, 859
Lumber.....M. feet B. M..	894, 324	28, 956	923, 280
Silver ore.....net tons..	992	364	1, 356
Wheat.....bushels..	20, 248, 392	29, 680, 477	49, 928, 869
General merchandise.....net tons..	57, 038	38, 336	95, 374
Passengers.....number..	9, 577	10, 300	19, 877

WESTBOUND.

Coal, hard.....net tons..	880, 417	110, 811	991, 228
Coal, soft.....do....	4, 589, 501	874, 140	5, 463, 641
Flour.....barrels..	107	243	350
Grain.....bushels..	500	5, 041	5, 541
Manufactured iron.....net tons..	135, 777	19, 349	185, 126
Salt.....barrels..	277, 895	87, 564	365, 459
General merchandise.....net tons..	419, 390	217, 245	636, 635
Passengers.....number..	12, 029	5, 789	17, 818
Freight:			
East bound.....net tons..	20, 451, 127	3, 762, 775	24, 213, 902
West bound.....do....	6, 066, 789	1, 265, 415	7, 332, 204
Total freight.....do....	26, 517, 916	5, 028, 190	31, 546, 106
Vessel passages.....number..	12, 153	3, 967	16, 120
Registered tonnage.....net..	20, 160, 042	4, 204, 096	24, 364, 138

NOTE.—In addition to the above traffic, 19,500 cords of pulp wood passed down the rapids, bound for lower lake ports.



Monthly traffic during season of 1904.

Month.	East bound.	West bound.	Total freight.
	Net tons.	Net tons.	Net tons.
April .....		32	32
May .....	272,606	177,282	449,888
June .....	1,997,241	1,141,995	3,139,236
July .....	4,086,822	1,522,257	5,609,079
August .....	4,220,040	1,424,732	5,644,772
September .....	4,139,831	1,106,826	5,246,657
October .....	4,616,662	957,247	5,573,909
November .....	4,063,727	847,941	4,911,668
December .....	816,973	153,892	970,865
Total .....	24,213,902	7,332,204	31,546,106

Freight between Lake Superior and each of the other lakes.

[Classified with reference to American and Canadian vessels and ports.]

Freight carried by—	Ports.		East bound from Lake Superior to—				Total.
	From—	To—	Lake Michigan	Lake Huron.	Lake Erie.	Lake Ontario.	
American vessels...	American ....	American ....	2,502,312	125,788	20,122,105	41,242	22,791,447
Do .....	do .....	Canadian .....		34,647	11,542	32,354	78,543
Do .....	Canadian .....	American ....	7,095	12,500	99,997		119,592
Canadian vessels...	do .....	Canadian .....		844,644	1,039	190,396	1,036,079
Do .....	do .....	American ....		5,460	143,579		149,039
Do .....	American ....	Canadian .....		21,468		17,734	39,202
Total east bound.			2,509,407	1,044,507	20,378,262	281,726	24,213,902

Freight carried by—	Ports.		West bound to Lake Superior from—				Total.
	From—	To—	Lake Michigan	Lake Huron.	Lake Erie.	Lake Ontario.	
American vessels...	American ....	American ....	62,760	69,376	6,064,670	11,772	6,208,578
Do .....	do .....	Canadian .....	9,404	1,672	409,854	2,547	423,477
Do .....	Canadian .....	American ....					
Canadian vessels...	do .....	Canadian .....		24,490		60,420	264,910
Do .....	do .....	American ....		12,451		1,120	13,571
Do .....	American ....	Canadian .....			421,668		421,668
Total west bound.			72,164	287,989	6,896,192	75,859	7,332,204
Grand total ..			2,581,571	1,332,496	27,274,454	357,585	31,546,106

Estimated value of total freight passing the canals at Sault Ste. Marie, Michigan and Ontario, for the season of 1904.

Item.	Quantity.	Price per unit.	Valuation.
Coal, anthracite .....	net tons..		
Coal, bituminous .....	do .....		
Flour .....	barrels..		
Wheat .....	bushels..		
Grain, other than wheat .....	do .....		
Manufactured iron .....	net tons..		
Pig iron .....	do .....		
Salt .....	barrels..		
Copper (refined and matte) .....	net tons..		
Iron ore .....	do .....		
Lumber .....	M feet B. M..		
Silver ore .....	net tons..		
Building stone .....	do .....		
General merchandise .....	do .....		
Total .....			334,502,686



The value of grain, other than wheat, as given in the above table, is computed as follows:

Articles.	Bushels.	Price per unit.	Total value.
Rye.....	915,755	\$0.744	\$681,321.72
Oats.....	11,006,881	.825	3,577,236.88
Barley.....	7,754,739	.382	2,962,310.30
Flax.....	18,353,617	1.173	15,663,792.74
Total.....	33,030,992	a .70	22,884,661.09

a Average.

Relative monetary values of freight.

	Per cent.
Coal (anthracite and bituminous).....	5.88
Cereals (wheat, rye, oats, corn, barley, flax, and flour).....	30.33
Iron (iron ore, manufactured, and pig iron).....	21.30
Copper.....	7.86
Lumber.....	4.90
All other products.....	29.73
Total.....	100.00

Transportation charges, including loading and unloading, on freight passing through canals at Sault Ste. Marie, Michigan and Ontario, for the season of 1904.

Articles.	Quantity.	Rate per unit.	Amount.
Coal.....net tons..	6,454,869	\$0.40	\$2,581,947.60
Flour.....barrels..	4,710,588	.18	612,809.94
Wheat.....bushels..	49,928,869	.018	898,719.64
Grain, other than wheat.....do....	33,030,992	.018	594,557.86
Manufactured iron.....net tons..	185,126	2.00	370,252.00
Pig iron.....do....	44,859	1.50	67,288.50
Salt.....barrels..	365,459	.10	36,545.90
Copper.....net tons..	109,605	1.45	158,927.25
Iron ore.....do....	19,635,797	.63	12,370,552.11
Lumber.....M feet B. M..	923,280	2.55	2,354,364.00
Silver ore.....net tons..	1,356	2.00	2,712.00
Building stone.....do....	27,093	1.50	40,639.50
General merchandise.....do....	732,009	2.00	1,464,018.00
Total.....			21,552,894.30

Classification of American and Canadian vessels, showing valuation and the tonnage and passengers carried by each of them through the canals at Sault Ste. Marie, Michigan and Ontario, during season of 1904.

AMERICAN VESSELS.

Class.	No.	Valuation.	Tonnage.		Passen- gers.
			Regis- tered.	Freight (net tons).	
Steamers.....	563	\$56,622,700	921,585	23,958,873	14,123
Sailing.....	224	7,166,600	250,915	5,654,815	.....
Unregistered.....				7,949	.....
Total.....	787	63,789,300	1,172,500	29,621,637	14,123

CANADIAN VESSELS.

Steamers.....	89	\$4,976,700	57,666	1,761,564	23,572
Sailing.....	10	400,400	10,452	114,245	.....
Unregistered.....				48,660	.....
Total.....	99	5,377,100	68,118	1,924,469	23,572
Grand total.....	886	69,166,400	1,240,618	31,546,106	37,695

American vessels carried 94 per cent of the total freight and 37 per cent of the total passengers.

Canadian vessels carried 6 per cent of the total freight and 63 per cent of the total passengers.

Unregistered American craft carried 7,949 net tons of freight in 299 passages, or an average of  $26\frac{1}{2}$  tons per passage.

Unregistered Canadian craft carried 48,660 net tons of freight in 214 passages, or an average of  $227\frac{7}{10}$  tons per passage.

Of the 16,120 passages for the season, 2,626 were by 100 vessels under 100 tons register, with an average register of 31 tons. The total freight carried by such craft amounted to 2,055 net tons.

Classification of registered vessels as to length and beam over all.

Length.	Beam.	Number of vessels.					
		Year.					
		1899.	1900.	1901.	1902.	1903.	1904.
30 to 100 feet.	5 to 21 feet.	109	82	85	84	82	89
100 to 200 feet.	21 to 39 feet.	289	320	282	248	227	205
200 to 300 feet.	32 to 43 feet.	267	285	303	337	314	291
300 to 400 feet.	38 to 50 feet.	126	136	152	179	175	182
400 to 500 feet.	45 to 53 feet.	41	56	71	87	97	118
500 to 600 feet.	56 feet.						1
Total		832	879	893	935	895	886

Average and maximum dimensions of, and percentage of total freight carried by vessels of different classes.

Class.	Boats of class using canal.	Aggregate registered tonnage.	Average registered tonnage.	Average length.	Maximum length.	Maximum beam.
Tons net register between—	Number.	Tons.	Tons.	Feet.	Feet.	Feet.
1 and 1,000	435	192,521	443	162.6	280	42
1,000 and 2,000	235	355,831	1,514	285.6	366	44.6
2,000 and 3,000	80	209,464	2,618	366.2	435	51.4
3,000 and 4,000	117	398,618	3,407	424.4	488	53
4,000 and 5,000	18	78,873	4,382	473.8	498.6	53
5,000 and 6,000	1	5,311	5,311	560	560	56
Total	886	1,240,618				

Class.	Passages of vessels of class.	Aggregate freight carried by vessels of class.	Average cargo.	Percentage of total freight carried by class.
Tons net register between—	Number.	Net tons.	Net tons.	
1 and 1,000	6,387	3,172,235	497	10.1
1,000 and 2,000	3,811	8,080,847	2,120	25.6
2,000 and 3,000	1,633	5,687,359	3,483	18
3,000 and 4,000	2,828	12,183,163	4,308	38.6
4,000 and 5,000	500	2,188,164	4,376	6.9
5,000 and 6,000	23	177,729	7,727	.6
Unregistered	938	66,609	83	.2
Total	16,120	31,546,106		100.0

Table showing yearly change in class of freighters as listed from their maximum freight cargoes.

Year.	Number of boats carrying between—								
	2,000 and 3,000 net tons.	3,000 and 4,000 net tons.	4,000 and 5,000 net tons.	5,000 and 6,000 net tons.	6,000 and 7,000 net tons.	7,000 and 8,000 net tons.	8,000 and 9,000 net tons.	9,000 and 10,000 net tons.	10,000 net tons and over.
1893.....	154	15							
1894.....	192	18							
1895.....	176	18	4						
1896.....	168	43	21	11					
1897.....	183	111	26	28	8				
1898.....	116	118	26	34	18	5			
1899.....	109	139	22	32	27	10	5		
1900.....	117	125	23	36	25	23	8		
1901.....	112	149	30	41	33	33	10		
1902.....	112	159	38	39	54	45	11		
1903.....	89	162	36	41	63	54	19		
1904.....	93	154	37	30	64	59	36	3	1

The nine new vessels put in commission for the Lake Superior trade were large steam freighters, ranging from 245 to 560 feet in length, and designed for economical speed of 12 miles per hour on a draft of 19 to 21 feet.

Yearly statement of freight carried by steamers and sailing vessels.

Year.	Steamers.		Sailing.		Unregistered craft.		Total freight.	Per cent- age of freight carried by sailing vessels. <sup>a</sup>
	Num- ber in com- mis- sion.	Freight car- ried.	Num- ber in com- mis- sion.	Freight carried.	Num- ber of pas- sages.	Freight carried.		
		<i>Net tons.</i>		<i>Net tons.</i>		<i>Net tons.</i>	<i>Net tons.</i>	
1888.....	312	4,292,976	210	2,095,347	219	23,100	6,411,423	33
1889.....	345	5,175,799	231	2,304,538	443	35,685	7,516,022	31
1890.....	369	6,291,873	229	2,743,839	447	5,501	9,041,213	30
1891.....	396	6,420,939	256	2,456,091	447	11,729	8,888,759	28
1892.....	460	7,960,477	275	3,242,441	227	11,415	11,214,333	30
1893.....	459	7,723,153	294	3,034,084	213	39,335	10,796,572	28
1894.....	493	9,795,752	321	3,381,860	172	18,248	13,195,860	26
1895.....	522	10,581,474	355	4,464,671	232	16,435	15,062,580	30
1896.....	509	11,878,089	350	4,349,083	210	11,889	16,239,061	27
1897.....	525	13,163,667	323	5,790,326	377	28,762	18,982,755	31
1898.....	523	14,569,066	333	6,653,157	286	12,441	21,234,664	31
1899.....	542	17,801,213	290	7,423,311	366	31,286	25,255,810	29
1900.....	569	19,586,750	310	5,999,184	454	57,139	25,643,073	23
1901.....	598	21,186,571	295	7,166,694	413	49,800	28,403,065	25
1902.....	656	28,465,068	279	7,431,230	490	64,848	35,961,146	21
1903.....	652	28,042,546	243	6,594,304	361	37,587	34,674,437	19
1904.....	652	25,720,437	234	5,769,060	513	56,609	31,546,106	18

<sup>a</sup> Sailing vessels include schooners, tow barges, and unriggered craft.

Maximum cargo records.

Class.	Number.	Maximum tonnage for one trip each.	
		Aggregate.	Average.
Steamers carrying over—		Net tons.	Net tons.
2,000 net tons.....	73	186,854	2,560
3,000 net tons.....	131	451,217	3,444
4,000 net tons.....	26	117,400	4,515
5,000 net tons.....	26	148,263	5,702
6,000 net tons.....	45	294,058	6,535
7,000 net tons.....	56	425,603	7,600
8,000 net tons.....	30	251,817	8,394
9,000 net tons.....	8	28,104	9,368
10,000 net tons.....			
11,000 net tons.....	1	11,536	11,536
Sailing carrying over—			
2,000 net tons.....	20	47,267	2,363
3,000 net tons.....	23	78,733	3,423
4,000 net tons.....	11	49,385	4,490
5,000 net tons.....	4	22,028	5,507
6,000 net tons.....	19	122,865	6,467
7,000 net tons.....	3	22,304	7,435
8,000 net tons.....	6	51,971	8,662
Total .....	477	2,309,405	.....

The above table shows that 477 different vessels in a single trip of each carried a total of 2,309,405 net tons.

Individual maximum records made by vessels during the season.

Name of vessel.	Maximum.	Amount.	Owners.
Steamer Augustus B. Wolvin.....	Single cargo, net tons.	11,536	Acme Steamship Co.
Barges Manila, Marsala, and John Smeaton.	do .....	8,736	Pittsburg Steamship Co.
Steamer Augustus B. Wolvin.....	Total cargoes, net tons.	177,729	Acme Steamship Co.
Steamer Huronic.....	Miles run.....	33,516	Northern Navigation Co.
Steamer Augustus B. Wolvin.....	Mile-tons .....	156,410,487	Acme Steamship Co.

The maximum traffic for a single day was on September 6, when 287,399 freight tons passed through the canals on 99 vessels, having an aggregate registered tonnage of 180,325.

The minimum traffic was on May 2, when one vessel registering 27 tons passed through the canals carrying no freight. There were no passages on December 19, 20, and 21.

DELAYS.

The American Canal records show that vessels necessarily spent 17,057 hours and 27 minutes in canal, or an average of 1 hour, 33 minutes, and 55 seconds, which includes time waiting for lockage and passage through locks and canal, the latter being 1½ miles long.

Other delays at canal, which included taking on supplies, waiting for daylight or favorable weather, amounted to 10,917 hours and 43 minutes.

Other delays to boats, due to operating railway swing bridge, amounted to 13 minutes.

Trains were delayed 10 hours and 41 minutes by passing boats temporarily preventing the closing of bridge.

COMPARATIVE TRAFFIC, YEARS 1903 AND 1904.

Lake commerce through the canals at Sault Ste. Marie, Michigan and Ontario, for the seasons of 1903 and 1904.

Item.	Traffic for 1904.		Total traffic for—	
	United States canal.	Canadian canal.	Season 1904.	Season 1903.
Vessel passages:				
Steamers .....	8,631	3,557	12,188	14,027
Sailing .....	2,790	204	2,994	3,569
Unregistered .....	732	206	938	1,000
Total .....	12,153	3,967	16,120	18,596
Lockages .....	7,293	3,022	10,315	11,642
Tonnage:				
Registered.....net..	20,160,042	4,204,096	24,364,138	27,736,444
Freight.....net tons..	26,517,916	5,028,190	31,546,106	34,674,437
Passengers.....number..	21,606	16,089	37,695	55,175
Coal:				
Hard .....	880,417	110,811	991,228	1,149,006
Soft .....	4,589,501	874,140	5,463,641	5,788,628
Flour .....	2,774,970	1,935,568	4,710,538	7,093,380
Wheat.....bushels..	20,248,392	29,680,477	49,928,869	61,384,652
Grain, other than wheat .....	27,877,579	5,153,413	33,030,992	32,095,646
Manufactured and pig iron .....	169,368	60,617	229,985	193,267
Salt .....	277,895	87,564	365,459	454,882
Copper.....net tons..	100,519	9,086	109,605	112,877
Iron ore .....	17,207,260	2,428,537	19,635,797	21,654,898
Lumber.....M feet B. M..	894,324	28,956	923,280	1,003,192
Silver ore.....net tons..	992	364	1,356	.....
Building stone .....	25,538	1,555	27,093	21,300
General merchandise .....	476,428	255,581	732,009	659,839

Item.	Gain, 1904.		Loss, 1904.	
	Amount.	Per cent.	Amount.	Per cent.
Vessel passages:				
Steamers.....number..			1,839	13
Sailing .....			575	16
Unregistered .....			62	6
Total .....			2,476	13
Lockages .....			1,327	11
Tonnage:				
Registered.....net..			3,372,306	12
Freight.....net tons..			3,128,331	9
Passengers.....number..			17,480	32
Coal:				
Hard .....			157,777	14
Soft.....do.....			324,987	6
Flour .....			2,382,842	34
Wheat.....bushels..			11,455,683	19
Grain, other than wheat .....	935,346	3		
Manufactured and pig iron .....	36,718	19		
Salt .....			89,423	20
Copper.....net tons..			3,272	3
Iron ore .....			2,019,101	9
Lumber.....M feet B. M..			79,912	8
Silver ore.....net tons..	1,356			
Building stone .....	5,793	27		
General merchandise .....	72,170	11		

## 2258 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

## YEARLY SUMMARIES SINCE 1887.

*Total freight, its valuation, freight charges, average haul or distance freight was carried, and rate per ton per mile.*

Year.	Total freight.	Valuation of freight	Freight charges.	Average haul	Freight charges, per mile-ton.	Value of American craft.	Value of Canadian craft.
	<i>Total freight.</i>			<i>Miles.</i>	<i>Miles.</i>		
1887.....	649	757	\$	811.4	2.3	\$17,684,660	\$2,089,400
1888.....	423	619		806.4	1.5	20,381,100	1,514,800
1889.....	622	527		790.4	1.6	25,328,600	1,597,600
1890.....	213	944		797.2	1.3	27,857,700	1,777,800
1891.....	769	208		820.4	1.35	31,947,300	2,119,500
1892.....	833	267		822.4	1.31	36,230,100	2,108,700
1893.....	572	967		831.9	1.1	39,017,400	2,115,700
1894.....	860	502		821.1	.99	41,124,200	1,969,800
1895.....	540	129		830.0	1.14	40,858,800	2,037,000
1896.....	661	842		836.4	.99	43,006,200	2,135,300
1897.....	755	927		841.3	.83	42,875,700	2,001,400
1898.....	664	740		842.6	.79	45,199,800	2,491,900
1899.....	810	750		827.2	1.06	65,000,520	3,869,600
1900.....	678	969		825.9	1.18	66,116,583	3,618,576
1901.....	665	865		823.3	.99	57,244,200	3,811,900
1902.....	146	300		827.4	.89	67,205,000	3,792,400
1903.....	437	614		835.6	.92	68,252,800	5,384,500
1904.....	106	686	\$1,034,024	843.5	.81	63,789,300	5,877,100

*Freight rates for water transportation to and from Lake Superior.*

Item.	1887	1888	1889	1890	1891	1892	1893	1894	1895
Coal, per net ton.....	\$0.90	\$0.70	\$0.47	\$0.45	\$0.43	\$0.41	\$0.40	\$0.40	\$0.37
Flour, per barrel.....	.29	.17	.14	.13	.15	.16	.17	.14	.14
Wheat, per bushel.....	.07	.03	.04	.03	.04	.03	.028	.02	.044
Grain, per bushel.....	.07	.04	.03	.02	.03	.03	.02	.02	.045
Manufactured iron, per net ton.....	2.35	1.40	2.10	1.34	2.50	2.15	2.00	.90	1.50
Pig iron, per net ton.....	2.35	1.30	1.45	1.35	1.17	1.23	1.30	1.15	1.05
Salt, per barrel.....	.18	.16	.14	.15	.14	.15	.12	.12	.13
Copper, per net ton.....	2.60	2.35	2.25	2.38	2.00	1.40	1.75	1.95	1.66
Iron ore, per net ton.....	1.75	1.28	1.14	1.10	.84	1.00	.80	.70	.82
Lumber, per M feet B. M.....	4.00	2.40	2.70	2.34	2.70	2.95	2.35	1.90	2.00
Silver ore, per net ton.....	3.00	1.90	1.90	2.25	2.25	2.25	2.25	2.25	2.33
Building stone, per net ton.....	1.15	2.05	2.02	2.00	2.00	1.67	1.36	1.28	1.20
Unclassified freight, per net ton.....	4.00	3.00	3.00	2.75	3.54	3.80	3.00	2.75	2.50

Item.	1896	1897	1898	1899	1900	1901	1902	1903	1904
Coal, per net ton.....	\$0.32	\$0.30	\$0.25	\$0.46	\$0.44	\$0.38	\$0.45	\$0.53	\$0.40
Flour, per barrel.....	.11	.10	.10	.13	.12	.12	.12	.12	.13
Wheat, per bushel.....	.02	.017	.02	.036	.02	.023	.019	.018	.018
Grain, per bushel.....	.02	.02	.02	.036	.02	.022	.019	.016	.018
Manufactured iron, per net ton.....	1.40	1.40	1.40	1.70	2.00	2.00	2.00	2.00	2.00
Pig iron, per net ton.....	1.06	1.05	1.05	1.50	1.50	1.50	1.50	1.50	1.50
Salt, per barrel.....	.15	.15	.15	.15	.15	.15	.15	.15	.10
Copper, per net ton.....	1.95	1.95	2.00	2.00	1.60	1.65	1.40	1.43	1.45
Iron ore, per net ton.....	.82	.65	.60	.70	1.05	.74	.64	.75	.63
Lumber, per M feet B. M.....	1.40	1.55	1.65	3.00	2.30	2.55	2.45	2.60	2.55
Silver ore, per net ton.....	2.31	2.31	..	2.50	2.00	..	2.00	..	2.00
Building stone, per net ton.....	1.50	1.50	1.50	2.00	1.50	1.50	1.50	1.50	1.50
Unclassified freight, per net ton.....	2.30	2.30	2.40	2.50	2.00	2.25	2.00	2.00	2.00

*Total freight valuations since 1887.*

Item.	1887.	1888.	1889.	1890.	1891.	1892.
Coal (hard and soft) .....	\$4,735,454	\$7,367,644	\$5,702,190	\$7,619,238	\$8,776,362	\$10,164,981
Flour .....	7,863,675	10,953,625	11,143,535	16,195,520	18,900,715	21,672,540
Wheat .....	22,634,590	18,224,424	15,907,217	15,893,022	38,040,239	30,746,085
Grain (other than wheat) ...	759,653	1,981,862	2,090,580	2,008,496	1,011,462	933,346
Manufactured iron .....	3,085,750	2,442,950	1,577,250	4,680,750	2,128,000	2,988,600
Pig iron .....	241,468	252,348	442,272	386,104	462,077	709,716
Salt .....	204,906	210,433	168,250	179,431	234,528	275,740
Copper .....	6,977,200	5,792,000	6,691,200	8,745,800	18,838,000	12,998,600
Iron ore .....	8,741,995	8,996,808	14,335,492	16,711,688	12,460,744	17,153,962
Lumber .....	2,974,068	4,326,696	5,679,972	6,514,722	6,593,490	9,231,192
Silver ore and bullion .....	53,826	520,579	914,589	527,807	266,211	296,815
Building stone .....	134,010	835,410	335,380	479,730	440,800	396,980
Unclassified freight .....	20,675,160	20,751,240	18,744,600	22,277,640	25,025,580	27,548,760
Total .....	79,031,757	82,156,019	83,732,527	102,214,948	128,178,208	135,117,267

Item.	1893.	1894.	1895.	1896.	1897.	1898.
Coal (hard and soft) .....	\$10,528,420	\$8,191,917	\$6,993,351	\$8,452,073	\$9,456,824	\$10,334,461
Flour .....	29,682,696	33,621,649	33,383,632	34,199,003	40,145,144	33,056,683
Wheat .....	32,611,239	22,316,469	30,041,863	47,442,347	48,654,143	49,871,997
Grain (other than wheat) ...	1,346,993	772,504	4,164,347	10,704,748	11,449,256	13,039,192
Manufactured iron .....	2,852,300	1,805,350	3,683,150	4,696,200	6,092,400	10,709,350
Pig iron .....	550,902	331,452	346,788	377,298	176,437	476,775
Salt .....	228,730	237,461	202,439	178,136	214,086	226,170
Copper .....	17,506,000	19,914,600	21,490,400	23,374,400	24,464,800	29,814,240
Iron ore .....	14,050,946	17,027,078	22,332,319	25,705,062	31,901,145	35,120,880
Lumber .....	10,598,810	11,564,608	8,888,400	8,562,325	10,875,762	12,984,532
Silver ore and bullion .....	379,861	46,144	11,200	26,880	560	.....
Building stone .....	194,260	214,170	238,760	177,310	62,490	46,700
Unclassified freight .....	24,910,800	27,071,100	27,798,480	31,251,060	34,742,880	37,388,760
Total .....	145,436,957	143,114,502	159,575,129	196,146,842	218,235,927	233,069,740

Item.	1899.	1900.	1901.	1902.	1903.	1904.
Coal (hard and soft) .....	\$12,854,278	\$14,620,840	\$15,492,226	\$16,570,398	\$24,898,407	\$19,657,221
Flour .....	25,610,929	27,042,752	24,811,637	31,185,840	31,920,210	25,907,959
Wheat .....	43,798,001	28,342,511	36,440,719	55,246,295	49,107,642	52,425,313
Grain (other than wheat) ...	17,700,552	14,071,953	22,779,703	25,521,556	22,787,909	23,121,694
Manufactured iron .....	19,111,009	11,551,000	17,609,800	20,323,380	18,385,950	18,512,600
Pig iron .....	457,762	851,313	485,520	277,925	522,440	672,885
Salt .....	237,252	328,895	332,830	288,149	318,417	255,821
Copper .....	38,428,800	39,319,800	26,227,866	22,916,280	25,961,710	26,305,200
Iron ore .....	52,116,016	61,663,380	58,794,509	75,260,420	74,709,398	52,034,862
Lumber .....	17,646,969	15,009,241	16,617,922	17,736,404	18,057,456	16,388,220
Silver ore and bullion .....	60,875	13,750	.....	125	.....	74,580
Building stone .....	468,756	586,824	559,008	467,028	255,600	325,116
Unclassified freight .....	52,873,560	54,139,700	69,755,125	92,512,500	82,479,875	98,821,215
Total .....	281,364,750	267,041,959	298,906,865	358,306,300	349,405,014	334,502,686



## 2260 REPORT OF THE CHIEF OF DIVISIONS, U. S. ARMY.

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*How long and how much would it take to get to St. Marks Bay?*

Year	Number of rafts	Saw logs M feet B. M.	Number of rafts	Pulp wood, cords
1891	7	13,000		
1892	15	21,000		
1893	17	31,950		
1894	17	29,450		
1895	5	9,000		
1896	11	20,450		
1897	12	25,500		
1898	22	39,500		
1899	16	29,100	1	500
1900	6	18,366		
1901	2	4,500		
1902	3	2,200		
1903	2	4,500		
1904	2	3,000	2	3,700
1905	1	2,000	6	15,000
1906	5	8,500	5	15,500
1907	4	9,000	5	10,100
1908	2	5,000	5	6,500
1909				
1910			5	19,500

<sup>a</sup> Includes 1 raft, the number of feet it contained not being known.

*Statement of commerce through both American and Canadian canals at Sault Ste. Marie, Mich. and Ontario, for each year from first opening in 1855.*

Season.			Class and tonnage of vessels.				
Year.	Date of opening canal.	Date of closing canal.	Passages by—			Total passages.	Net registered tonnage.
			Steamers.	Sailing vessels.	Unregistered craft.		
1855..	June 18	Nov. 23	149	44	.....	193	106,296
1856..	May 4	Nov. 28	178	112	.....	290	101,458
1857..	May 9	Nov. 30	184	192	.....	376	180,820
1858..	Apr. 18	Nov. 20	224	182	.....	406	219,819
1859..	May 3	Nov. 28	258	411	.....	669	352,642
1860..	May 11	Nov. 26	337	579	.....	916	408,657
1861..	May 3	Nov. 14	296	242	.....	538	276,639
1862..	Apr. 27	Nov. 27	295	543	.....	838	359,612
1863..	Apr. 28	Nov. 24	305	952	.....	1,257	507,434
1864..	May 2	Dec. 4	366	1,045	.....	1,411	571,438
1865..	May 1	Dec. 3	395	602	.....	997	409,062
1866..	May 5	....do....	453	555	.....	1,008	458,590
1867..	May 4	....do....	466	839	.....	1,305	556,899
1868..	May 2	....do....	338	817	.....	1,155	482,563
1869..	May 4	Nov. 29	399	939	.....	1,338	524,885
1870..	Apr. 29	Dec. 1	431	1,397	.....	1,828	690,826
1871..	May 8	Nov. 29	573	1,064	.....	1,637	752,101
1872..	May 11	Nov. 26	792	1,212	.....	2,004	914,735
1873..	May 5	Nov. 18	968	1,519	.....	2,517	1,204,446
1874..	May 12	Dec. 2	901	833	.....	1,734	1,070,857
1875..	....do....	....do....	1,464	569	.....	2,033	1,259,534
1876..	May 8	Nov. 26	1,733	684	.....	2,417	1,541,676
1877..	May 2	Nov. 30	1,050	1,401	.....	2,451	1,439,216
1878..	Apr. 8	Dec. 3	1,476	1,091	.....	2,567	1,667,136
1879..	May 2	....do....	1,618	1,403	100	3,121	1,677,071
1880..	Apr. 28	Nov. 15	1,785	1,718	50	3,503	1,784,890
1881..	May 7	Dec. 5	2,117	1,706	181	4,004	2,092,757
1882..	Apr. 21	Dec. 3	2,739	1,663	372	4,774	2,468,088
1883..	May 2	Dec. 11	2,620	1,458	237	4,315	2,042,259
1884..	Apr. 23	Dec. 10	3,609	1,709	371	5,689	2,997,837
1885..	May 6	Dec. 2	3,354	1,589	337	5,380	3,035,937
1886..	Apr. 25	Dec. 4	4,584	2,534	306	7,424	4,219,397
1887..	May 1	Dec. 2	5,968	2,562	825	9,355	4,897,598
1888..	May 7	Dec. 4	5,305	2,009	489	7,803	5,130,659
1889..	Apr. 15	....do....	6,501	2,635	443	9,579	7,221,935
1890..	Apr. 20	Dec. 3	7,268	2,872	417	10,557	8,454,435
1891..	Apr. 27	Dec. 7	7,339	2,405	447	10,191	8,400,685
1892..	Apr. 18	Dec. 6	8,737	3,324	519	12,580	10,647,203
1893..	May 1	Dec. 5	8,379	2,955	674	12,008	8,949,754
1894..	Apr. 17	Dec. 6	10,208	3,676	607	14,491	13,110,366
1895..	Apr. 25	Dec. 11	12,495	4,790	671	17,956	16,806,781
1896..	Apr. 21	Dec. 8	13,404	4,391	820	18,615	17,249,418
1897..	....do....	Dec. 14	12,029	4,488	704	17,171	17,619,933
1898..	Apr. 11	....do....	12,461	4,449	851	17,761	18,622,754
1899..	Apr. 26	Dec. 20	14,378	4,776	1,101	20,255	21,958,347
1900..	Apr. 19	Dec. 16	14,426	4,004	1,022	19,452	22,315,834
1901..	Apr. 20	Dec. 21	14,372	4,482	1,187	20,041	24,626,976
1902..	Apr. 1	Dec. 20	17,069	4,368	1,222	22,659	31,955,582
1903..	Apr. 2	Dec. 15	14,027	3,569	1,000	18,596	27,736,444
1904..	Apr. 30	Dec. 26	12,188	2,994	938	16,120	24,364,188

## 2262 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Statement of commerce through both American and Canadian canals at Sault Ste. Marie, Mich. and Ontario, etc.—Continued.

Season.			Passenger and freight traffic						
Year.	Date of opening canal.	Date of closing canal.	Passen- gers.	Coal.	Flour.	Wheat.	Grain, other than wheat.	Manufac- tured and pig iron.	Salt.
			No.	Net tons.	Barrels.	Bushels.			Barrels.
1855..	June 18	Nov. 23	8,296	1,414	10,269	.....			196
1856..	May 4	Nov. 28	7,992	3,968	17,686	.....			1,027
1857..	May 9	Nov. 30	6,650	5,298	18,515	.....			1,118
1858..	Apr. 16	Nov. 20	9,280	4,118	13,782	.....			1,223
1859..	May 8	Nov. 28	.....	8,884	30,459	74			2,787
1860..	May 11	Nov. 26		..	50,250	.....			.....
1861..	May 3	Nov. 14		17	22,748	228			3,014
1862..	Apr. 27	Nov. 27		16	17,291	.....			2,477
1863..	Apr. 28	Nov. 24		15	31,975	.....			1,506
1864..	May 2	Dec. 4		12	33,987	.....			1,776
1865..	May 1	Dec. 3		..	34,965	.....			3,175
1866..	May 5	....do....		15	33,603	.....			4,454
1867..	May 4	....do....		17	28,345	.....			5,315
1868..	May 2	....do....		14	27,372	.....			4,624
1869..	May 4	Nov. 29		10	32,007	.....			5,910
1870..	Apr. 29	Dec. 1		12	..	100			11,099
1871..	May 8	Nov. 29		18	0	1, 706			36,199
1872..	May 11	Nov. 28		15	1	134			42,690
1873..	May 5	Nov. 18		10	2	397			29,335
1874..	May 12	Dec. 2		14	5	115			44,231
1875..	....do....	....do....		10	1	788			43,989
1876..	May 8	Nov. 28		10	7	1, 549			46,666
1877..	May 2	Nov. 30		15	7	788			63,168
1878..	Apr. 8	Dec. 8		16	9	1, 140			63,520
1879..	May 2	....do....		14	1	166			92,245
1880..	Apr. 28	Nov. 15		11	0	2, 720			77,916
1881..	May 7	Dec. 5		17	3	365			65,897
1882..	Apr. 21	Dec. 3		14	4	3, 356			176,612
1883..	May 2	Dec. 11		14	1	5, 173			70,898
1884..	Apr. 23	Dec. 10		19	3	11, 791			144,804
1885..	May 6	Dec. 2		11	3	15, 274, 218			136,355
1886..	Apr. 25	Dec. 4		19	5	18, 991, 485			156,677
1887..	May 1	Dec. 2		17	5	23, 096, 620			204,908
1888..	May 7	Dec. 4		11	5	18, 596, 351			210,433
1889..	Apr. 15	....do....		17	7	16, 231, 854			168,250
1890..	Apr. 20	Dec. 3		15	4	16, 217, 870			179,481
1891..	Apr. 27	Dec. 7		12	3	38, 816, 570			234,528
1892..	Apr. 18	Dec. 6		16	5	40, 994, 780			275,740
1893..	May 1	Dec. 5		10	4	43, 481, 652			228,730
1894..	Apr. 17	Dec. 6		14	3	34, 38			237,461
1895..	Apr. 25	Dec. 11		12	2	46, 50			269,919
1896..	Apr. 21	Dec. 8		10	3	63, 33			237,515
1897..	....do....	Dec. 14		12	3	55, 72			285,449
1898..	Apr. 11	....do....		10	3	62, 36			301,660
1899..	Apr. 26	Dec. 20		17	7	58, 35			316,336
1900..	Apr. 19	Dec. 16		17	18	40, 72			328,895
1901..	Apr. 20	Dec. 21		16	0	52, 36			443,774
1902..	Apr. 1	Dec. 20		18	10	76, 35			443,808
1903..	Apr. 2	Dec. 15		13	0	61, 32			454,862
1904..	Apr. 30	Dec. 26		19	21	49, 39			365,459

*Statement of commerce through both American and Canadian canals at Sault Ste. Marie, Mich. and Ontario, etc.—Continued.*

Season.			Passenger and freight traffic—Continued.						
Year.	Date of opening canal.	Date of closing canal.	Copper.	1				Unclassified freight.	Total freight.
			Net tons.	Net tons.	M. ft. B. M.	Net tons.	Net tons.	Net tons.	Net tons.
1855..	June 18	Nov. 23	3,196	1,447	127			5,690	14,503
1856..	May 4	Nov. 28	5,977	11,597	433			5,533	33,317
1857..	May 9	Nov. 30	4,400	26,185	680			7,140	51,607
1858..	Apr. 18	Nov. 20	6,944	31,035	183			9,567	67,002
1859..	May 3	Nov. 28	7,269	65,769	766			25,280	122,066
1860..	May 11	Nov. 26	9,000	120,000				14,916	153,721
1861..	May 3	Nov. 14	7,645	44,837	664			12,972	87,547
1862..	Apr. 27	Nov. 27	6,841	113,614	240			19,355	161,675
1863..	Apr. 28	Nov. 24	1,044	181,567	1,414			30,213	236,790
1864..	May 2	Dec. 4	5,331	213,753	2,012			33,477	284,360
1865..	May 1	Dec. 3	9,935	147,459	822			11,226	
1866..	May 5	do	9,550	152,102	660			32,310	
1867..	May 4	do	10,585	222,861	1,177			33,632	
1868..	May 2	do	12,222	191,939	1,404			31,843	
1869..	May 4	Nov. 29	18,662	239,368	1,423			41,813	
1870..	Apr. 29	Dec. 1	11,301	409,850	814	92	4,560	40,342	
1871..	May 8	Nov. 29	14,562	327,461	1,098	461	5,528	74,227	
1872..	May 11	Nov. 26	14,986	363,105	1,853	306	5,213	109,668	
1873..	May 5	Nov. 18	15,947	504,121	2,191	580	2,218	123,398	
1874..	May 12	Dec. 2	15,845	427,658	686	443	401	55,812	
1875..	do	do	18,396	493,408	4,498	847	2,978	70,128	
1876..	May 8	Nov. 26	25,756	609,752	17,820	965	2,102	91,119	
1877..	May 2	Nov. 30	16,767	568,082	15,873	1,020	2,506	64,201	
1878..	Apr. 8	Dec. 3	22,529	50	84,829	768	2,754	77	
1879..	May 2	do	22,309	75	43,439	324	2,226	79	
1880..	Apr. 28	Nov. 15	21,753	73	48,635	66	2,283	49	
1881..	May 7	Dec. 5	29,488	81	58,877		1,400	81	
1882..	Apr. 21	Dec. 3	25,409	80	62,783	22	428	87	
1883..	May 2	Dec. 11	31,024	82	87,131	814	05	71	
1884..	Apr. 23	Dec. 10	36,062	71	122,389	9,731	47	73	
1885..	May 6	Dec. 2	31,927	22	127,984	3,669	89	63	
1886..	Apr. 25	Dec. 4	38,627	09	138,688	2,009	49	26	
1887..	May 1	Dec. 2	34,686	13	165,226	350	01	66	
1888..	May 7	Dec. 4	28,960	17	240,372	3,385	41	54	
1889..	Apr. 15	do	33,456	55	315,664	5,947	38	10	
1890..	Apr. 20	Dec. 3	43,729	58	361,929	3,432	73	94	
1891..	Apr. 27	Dec. 7	69,190	13	366,305	1,731	80	93	
1892..	Apr. 18	Dec. 6	64,993	32	512,844	1,930	98	46	
1893..	May 1	Dec. 5	87,530	56	588,545	2,470	26	80	
1894..	Apr. 17	Dec. 6	99,573	76	722,788	412	17	65	
1895..	Apr. 25	Dec. 11	107,452	09	740,700	100	76	08	
1896..	Apr. 21	Dec. 8	116,872	50	684,986	240	31	51	
1897..	do	Dec. 14	122,324	15	805,612	5	49	48	
1898..	Apr. 11	do	124,228	1	895,485		70	46	
1899..	Apr. 26	Dec. 20	120,090	1	1,038,057	487	68	84	
1900..	Apr. 19	Dec. 16	131,066	1	909,861	110	02	97	
1901..	Apr. 20	Dec. 21	98,601	1	1,072,124		64	41	
1902..	Apr. 1	Dec. 20	120,612	55	1,091,471	1	19	00	
1903..	Apr. 2	Dec. 15	112,877	2	1,003,192		00	39	
1904..	Apr. 30	Dec. 26	109,605	1	923,280	1,356	93	09	

St. Marys Falls Canal, Michigan, State lock, 1855 to 1887.

St. Marys Falls Canal, Michigan, Weltzel lock, since September 1, 1881.

St. Marys Falls Canal, Michigan, Poe lock, since August 3, 1896.

Sault Ste. Marie Canal, Ontario, Canadian lock, since September 9, 1895.

GROWTH OF LAKE SUPERIOR COMMERCE.

The movement of freight to and from Lake Superior previous to the opening of the State canal in 1855 was entirely by boat to Sault Ste. Marie, where the cargoes were unloaded, then taken across the portage 1 mile long, and reloaded aboard boats.

In 1851 about 12,600 tons passed over the tramway portage; the transshipments to Lake Superior ports comprised the articles hay, oats, dry goods, groceries, and mining machinery to the value of \$1,000,000, and those to lower lake ports included copper, iron blooms, and fish, valued at \$675,000.

During the fifty years the canal has been in commission the yearly traffic has increased from a minimum of 14,503 tons to a maximum of 35,961,146 tons.

The increase in tonnage of each year's traffic over that of the preceding year has averaged about 20 per cent. For each decade the average percentage of yearly increase and the total tonnage are as follows:

Years.	Percent.	Tons.
1855-1864 .....	44	1, 203, 358
1865-1874 .....	12	4, 829, 247
1875-1884 .....	17	14, 868, 639
1885-1894 .....	17	80, 343, 218
1895-1904 .....	12	253, 002, 697
Total.....	.....	354, 247, 159

HISTORICAL NOTES.

The St. Marys Rapids are about half a mile wide and three-fourths of a mile long. The fall ranges from 16½ to 20½ feet with the varying stages of water.

The first canal was built on the Canadian side of the river by the Northwest Fur Company in 1797-98. The lock was 38 feet long, 8 feet 9 inches wide, with a lift of 9 feet. A towpath was made along the shore for oxen to track the batteaux and canoes through the upper part of the rapids. The lock, excepting its timber floor and miter sills, was destroyed in 1814 by United States troops from Mackinac Island under command of Major Holmes.

The first ship canal, known as the State Canal, was built on the American side of the river in 1853 to 1855, some 750,000 acres of land in Michigan having been granted by the United States Congress for the construction thereof. The canal was 1½ miles long, 64 feet wide at bottom, 100 feet wide at water surface, and 13 feet deep. There were two tandem locks of masonry, each 350 by 70 feet, having 11½ feet of water on the miter sills and a lift of about 9 feet each. Capt. A. Canfield, topographical engineers, United States Army, made the original surveys. Charles T. Harvey was superintendent of construction, and the St. Marys Falls Ship Canal Company was the contractor. The locks were destroyed in 1888 by excavations for the present Poe lock.

The Weitzel lock, 515 feet long, 80 feet wide in chamber, narrowing to 60 feet at the gates, with 17 feet depth of water on the miter sills when the upper pool is 601.9 feet and the lower pool 584.4 feet above mean tide at New York, was built by the United States in the years 1870 to 1881. During the same period the depth of the canal was increased to 16 feet, the mean width to 160 feet, and the stone slope walls were replaced with timber piers having a vertical face. Gen. Orlando M. Poe was the engineer officer in charge of the district from 1870 to 1873, and Gen. Godfrey Weitzel from 1873 to 1882. Alfred Noble was the assistant engineer in local charge from 1870 to 1882. Boyle & Roach were the principal contractors.

The Canadian Canal, 1½ miles long, 150 feet wide, and 22 feet deep, with lock 900 feet long, 60 feet wide, having 22 feet of water on the miter sills, was built on the north side of the river in the years 1888 to 1895. Hon. Collingwood Schreiber was chief engineer of Dominion canals, etc., and W. G. McNeill Thompson was the government engineer in local charge of construction work. Ryan & Haney were the contractors.

The Poe lock, 800 feet long, 100 feet wide, and having 22 feet of water on the sills, was built by the United States in the years 1887 to 1896. Gen. Orlando M. Poe was the engineer officer in charge of the district from 1883 to 1895, and E. S. Wheeler the assistant engineer in local charge of construction work from 1882 to 1897. Hughes Bros. & Bangs were the principal contractors.

The American Canal since 1892 has been deepened to 25 feet, and its entrance piers have been extended so that its total length at the falls is now 1½ miles. Its

width is variable, being 500 feet at the upper entrance, 108 feet at the canal gate, 270 feet at the basin above locks, and 1,000 feet at the lower entrance. Dunbar & Sullivan and J. B. Donnelly were the principal contractors

The canal also practically includes that part of the channels through St. Marys River which have been improved through shoals of sand, clay, bowlders, sandstone, and limestone rock. The United States Government made the first appropriation for improving the river channels in 1856. The Lake George route was improved for 12 feet draft, 1857 to 1860 and 1866 to 1869. The depth was increased to 16 feet, 1879 to 1883. The Hay Lake route was improved for a depth of 20 feet at mean stage of water, years 1882 to 1894. Betterment of the channels has been continued every year since, so that the dredged areas now total 34 miles in length with least width of 300 feet, increasing at angles and other critical places up to 1,000 feet. Last year excavation of channels was begun for 21 feet at lowest stage of water.

The engineer officers in past charge of the river improvements were Capt. A. W. Whipple, 1858-1861; Col. T. J. Cram, 1866-1870; Maj. O. M. Poe, 1870-1873; Col. G. Weitzel, 1873-1882; Maj. F. U. Farquhar, 1882-83; Col. O. M. Poe, 1883-1895; Col. G. J. Lydecker, 1896-1902, and Maj. W. H. Bixby, 1902-1904. J. Hickler & Sons, C. F. & H. T. Dunbar, and Carlin, Stickney & Cram were the principal contractors.

The cost of the several improvements, stated in round numbers, is as follows:

Locks and canal of 1855.....	\$1, 000, 000
Weitzel lock .....	1, 000, 000
Poe lock.....	3, 000, 000
Widening and deepening canal.....	3, 000, 000
Improving channel through river .....	4, 000, 000
Canadian lock, canal, and approaches.....	4, 000, 000

Hydraulic power is used for operating the American locks, a pressure of 115 pounds per square inch being used for the Weitzel lock machinery and a pressure of 200 pounds for the Poe lock machinery. Electricity generated by water power is used for operating the Canadian lock.

The Poe lock can be filled or emptied in about seven minutes, and the gates opened or closed in two minutes. The Weitzel lock can be operated in about the same time as the Poe lock. The Canadian lock can be operated in about eight minutes. An up-lockage of a single boat 350 feet long has been made through the Poe lock in eleven minutes, but the average time spent in making a lockage last season was nearly twenty-nine minutes, most of which was due to the slow movement of boats while entering and leaving locks. Frequently as many as five boats were included in a single lockage. The average time of lockage through the Canadian lock was sixteen minutes.

From 1855 to 1881 the canal was controlled by the State of Michigan and tolls were charged to cover operating and repair expenses, the rate at first being 6½ cents per registered ton, which was gradually reduced to 2½ cents. Similarly the minimum charge for lockage of a boat was reduced from \$5 to \$3. Since control was transferred to the United States in 1881 the American canal has been free for public use by all nations. Likewise the Canadian Canal has not collected tolls for either foreign or domestic commerce.

The lock force under State control consisted of about twenty men, having one watch only, as night navigation of the river was then impossible. Under United States control two watches, of twelve hours each, were established in 1881, and same continued to 1891, when three watches of eight hours each were organized. The force engaged in passing boats has been increased with the growth of commerce, the number now aggregating 74; in addition, there are 19 others employed as clerks, watchmen, and janitors.

## 2266 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

*Expenses for operating and care of St. Marys Falls Canal, Michigan.*

Year.	Operating.	Repairs.	Total.	Cost per freight ton.
				<i>Mills.</i>
1882 .....	\$21,185.86	\$10,021.62	\$31,207.48	16.62
1883 .....	22,134.97	13,374.73	35,509.70	18.94
1884 .....	20,337.61	10,875.32	31,212.93	12.28
1885 .....	18,635.27	8,607.18	27,242.45	9.49
1886 .....	18,871.84	6,529.11	25,400.95	6.86
1887 .....	18,887.11	3,251.81	22,138.92	4.53
1888 .....	22,858.57	7,040.15	29,898.72	5.36
1889 .....	23,987.45	6,762.00	30,749.45	4.44
1890 .....	22,737.53	11,586.32	34,323.85	4.14
1891 .....	34,657.27	13,673.62	48,330.89	5.80
1892 .....	37,895.93	23,493.81	61,389.74	6.07
1893 .....	34,402.15	8,009.97	42,412.12	3.91
1894 .....	43,103.27	12,109.82	55,213.09	4.95
1895 .....	39,063.20	11,845.47	50,908.67	3.73
1896 .....	34,806.92	25,956.36	60,763.28	4.22
1897 .....	46,750.02	31,354.03	78,104.05	6.60
1898 .....	43,464.99	15,425.73	58,890.72	3.93
1899 .....	65,142.64	25,165.30	90,307.94	4.66
1900 .....	59,282.46	20,010.80	79,293.26	3.23
1901 .....	59,457.05	16,018.28	75,475.33	3.64
1902 .....	66,914.75	20,779.05	87,693.80	2.86
1903 .....	62,648.42	21,228.38	83,876.80	2.65
1904 .....	66,563.96	26,684.51	93,248.47	4.25

## REPORT OF MR. JOSEPH RIPLEY, GENERAL SUPERINTENDENT.

OFFICE OF ST. MARYS FALLS CANAL,  
Sault Ste. Marie, Mich., July 1, 1905.

COLONEL: I have the honor to submit the following report relative to operating and care of St. Marys Falls Canal, Michigan, for the fiscal year ending June 30, 1905:

## ORGANIZATION.

The regular force of 93 persons, viz, 1 general superintendent, 1 superintendent, 4 clerks, 1 chief engineman, 3 assistant superintendents, 1 overseer, 6 lock masters, 6 enginemen, 7 watchmen, 1 storekeeper, 2 recorders, 3 messengers, 9 first-grade lockmen, 9 second-grade lockmen, 15 third-grade lockmen, and 24 linemen were severally employed from nine to twelve months in locking boats, office work, and care of property. There were 16 laborers employed eight months in repairing piers, grading, and care of grounds. A carpenter, painter, stonecutter, and calker were occasionally employed.

## REPAIRS.

The ordinary maintenance and fitting-out repairs included the fixing or renewal of all damaged, worn-out, or broken parts of operating machinery, replacing of broken masonry with concrete, refilling piers, the painting of gates, snubbing posts, electric-light poles, and testing of all machinery.

Sixteen manholes were put in the upper and lower guard gates of the Poe lock to permit easy access and to provide ventilation. The interior of these gates were scraped, thoroughly cleaned, and then repainted for the first time since they were built.

The pressure pipes leading to the west-end valve chests for operating valve engines, were rearranged so as to permit easier access for repairs.

The planking over the miter wall of the upper guard gates was temporarily removed, in order to clean the accumulated sand and gravel from the valve gears, and to repair the intake valves.

New air pipes leading to the lower lock gates were placed in position for pumping out water leakage by compressed air.

The accumulated debris of sand, gravel, stones, etc., was removed from the culverts and lock floor.

Repairs to lock floor were made by replacing 20 broken rods in culverts with new ones. The Weitzel lock repairs consisted of renewing basement floor of pump house, overhauling cellar pump and valve engines; replacing 46 culvert rods, and rethreading truss rods on gates.

Special repairs to canal revetment piers consisted in replacing with concrete 316 feet of worn-out timber superstructure on southwest pier, located about 1 mile west of the office building.



## ACCIDENTS.

Charles A. St. Lawrence was drowned in the canal near Magazine street on August 7, 1904, and the body of an unknown man was found floating in the canal August 17. Three sailors had their legs broken by getting caught in bights of lines, and Lockman John Sterling had his hand badly crushed while operating southeast gate engine, Poe lock.

There were 46 minor accidents resulting in damage to property, such as breaking 86 pieces of timber in canal piers, 25 pieces of coping from lock walls, 1 fender strap on gates, bruising timbers of head gates, and in pulling out 3 snubbing posts along canal piers.

## DELAYS.

*Poe lock.*—Navigation through the Poe lock was delayed during the year fifty-five hours and fifteen minutes, as follows: One hour fifty-five minutes due to removing rope fenders lodged against miter sills of gates; one hour thirty minutes putting in two new pressure valves in south intermediate gate engine; five hours fifteen minutes repairing broken cable on southeast gate; twenty-five minutes to jamming of boats in lock; thirty minutes warping steamer out of lock; forty-one hours fifteen minutes pumping out lock to repack valve engines preparatory to substituting oil for water in pressure pipes; and removing about 12 cubic yards broken stone which had spalled off from south lock wall; four hours twenty-five minutes due to canal filling with ice on account of continued northwest winds during April and May.

*Weitzel lock.*—Delays in this lock amounted to fifty-five hours fifty-three minutes, as follows: Thirty minutes due to fouling of towline; fifty-five minutes to lodgment of pulp wood against miter sill; thirty minutes grounding of steamer on platform; fifteen minutes due to ice in canal; fifty-three hours forty-three minutes pumping out lock, repacking valve engines, filling pressure pipes with oil, and tightening truss rods on gates.

## REPORTS.

Of the special reports the most important submitted was that pertaining to statistics of commerce passing the American and Canadian canals at Sault Ste. Marie, Mich. and Ontario, during the calendar year 1904.

Others related to vessels striking obstructions in canal, renewal of experimental section on southwest canal pier with concrete, and special statistical data showing relation of traffic carried by steamers and sailing vessels.

## PERMITS.

Under date of July 15, 1904, the Secretary of War granted a revocable license to the State board of fish commissioners of Michigan, to use Island No. 4 for additional ponds, and the building thereon as a place of storage and for housing of extra employees.

Under date of May 8, 1905, the Secretary of War granted a permit to the Edison Sault Electric Company to build a temporary sand bag cofferdam from their dike to Island No. 1, and between Islands Nos. 1 and 2, St. Marys Rapids. Operations under this permit were begun on May 17 and were under progress on June 30.

*Statistical report of lake commerce through canals at Sault Ste. Marie, Mich., and Ontario, for the fiscal year ending June 30, 1905.*

Item.	United States canal.	Canadian canal.	Total.
Vessel passengers .....number..	15, 196	5, 040	20, 236
Lockages .....do....	9, 121	3, 671	12, 792
Registered tonnage .....net tons..	27, 272, 017	5, 849, 044	33, 121, 061
Freight tonnage .....do....	34, 385, 090	6, 705, 304	41, 090, 394
Passengers .....number..	22, 931	19, 286	42, 217
Coal, hard .....net tons..	959, 871	105, 753	1, 065, 624
Coal, soft.....do....	5, 083, 002	1, 005, 378	6, 088, 380
Flour .....barrels..	3, 116, 762	2, 233, 245	5, 350, 007
Wheat .....bushels..	19, 924, 494	29, 520, 702	49, 445, 196
Grain, other than wheat .....do....	29, 747, 536	6, 349, 703	36, 097, 239
Manufactured and pig iron .....net tons..	182, 490	75, 988	258, 478
Salt .....barrels..	321, 095	129, 162	450, 257
Copper .....net tons..	121, 419	11, 964	133, 383
Iron ore .....do....	24, 209, 459	3, 853, 325	28, 062, 784
Lumber .....M feet B. M..	975, 385	28, 820	1, 004, 205
Silver ore .....net tons..	757	192	949
Building stone .....do....	27, 326	1, 555	28, 881
General merchandise .....do....	537, 364	302, 406	839, 770

NOTE.—The United States canal was open to navigation two hundred and forty-four days during the fiscal year. The Canadian canal was open to navigation two hundred and sixty-one days during the fiscal year.



2268 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Comparative statement of commerce through St. Marys Falls Canal, Michigan, for the fiscal years 1904 and 1905.

	Fiscal year.		Increase.	Decrease.
	1904.	1905.		
Vessel passages.....number..	11,232	15,195	3,963	
Lockages.....do....	6,688	9,121	2,433	
Tonnage, registered.....net tons..	17,059,950	27,272,017	10,212,067	
Tonnage, freight.....do....	21,889,058	34,385,090	12,496,032	
Passengers.....number..	21,426	22,931	1,505	
Coal.....net tons..	4,542,461	6,042,873	1,500,412	
Flour.....barrels..	3,423,778	3,116,762		307,016
Wheat.....bushels..	23,859,524	19,924,494		3,935,030
Grain, other than wheat.....do....	25,296,313	29,747,536	4,451,223	
Manufactured and pig iron.....net tons..	113,783	182,490	68,707	
Salt.....barrels..	278,885	321,095	42,210	
Copper.....net tons..	79,143	121,419	42,276	
Iron ore.....do....	13,607,405	24,209,459	10,602,054	
Lumber.....M feet B. M..	868,041	975,385	107,344	
Silver ore.....net tons..	235	757	522	
Building stone.....do....	22,460	27,326	4,866	
General merchandise.....do....	389,823	537,364	147,541	

Summary of traffic through St. Marys Falls Canal, Michigan, for the fiscal year ending June 30, 1905.

Number of vessels through Weitzel lock .....	6,224	
Number of vessels through Poe lock .....	8,971	
		15,195
Number of lockages through Weitzel lock .....	4,245	
Number of lockages through Poe lock .....	4,876	
		9,121
Total registered tonnage .....	27,272,017	
Total freight tonnage .....	34,385,090	
Total time spent in making lockages, 4,539 hours 17 minutes.		
Average time spent in making a lockage, 29 minutes 52 seconds.		
Total time spent by vessels in passing locks, 7,420 hours 12 minutes.		
Average time spent by vessels in passing locks, 29 minutes 18 seconds.		
Cost per lockage .....		\$9.35
Cost per passage.....		\$5.61
Cost per registered ton.....mills..		3.13
Cost per freight ton.....do....		2.48

The Weitzel lock was open to navigation two hundred and twenty-seven days, from July 1 to December 5, 1904, and from April 23 to June 30, 1905.

The time for the Poe lock was two hundred and forty-four days, July 1 to December 13, 1904, and from April 14 to June 30, 1905.

Compared with the previous fiscal year the commerce through St. Marys Falls Canal, Michigan, shows an increase in the following items: Passages, 35 per cent; lockages, 36 per cent; registered tonnage, 60 per cent; freight tonnage, 57 per cent; coal, 33 per cent; grain, other than wheat, 18 per cent; manufactured and pig iron, 60 per cent; iron ore, 78 per cent; lumber, 12 per cent; building stone, 22 per cent; general merchandise, 38 per cent; silver ore, 222 per cent, and passengers, 7 per cent. A decrease is shown in the following items: Flour, 9 per cent, and wheat, 16 per cent.

In comparing the total traffic through the American and Canadian canals at Sault Ste. Marie, Michigan and Ontario, with the previous fiscal year, it shows an increase as follows: Passages, 37 per cent; lockages, 37 per cent; registered tonnage, 59 per cent, and freight tonnage, 56 per cent.

The total freight traffic of 41,090,394 tons is the largest in the history of the canals, and exceeds that of last year by 14,771,735 tons.

The canal post-office delivered 156,381 pieces of mail, consisting of 140,483 letters, 6,501 postals, 8,611 newspapers, and 786 parcels. In addition to this 826 pieces were returned to the city post-office after being held thirty days uncalled for, and 3,110 pieces were forwarded to new addresses.

The receipts from sale of 1,781 charts of the Great Lakes and connecting rivers amounted to \$296.12.

The compilation of traffic statements was done by Clerks Frank T. McArthur, John McMahon, and George S. Stanley.

Very respectfully, your obedient servant,

JOSEPH RIPLEY,  
*General Superintendent.*

Lieut. Col. CHAS. E. L. B. DAVIS,  
*Corps of Engineers.*

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O O 4.

IMPROVEMENT OF HAY LAKE AND NEEBISH CHANNELS, ST. MARYS RIVER, MICHIGAN.

This improvement was commenced in 1883, and the channel opened to navigation on June 7, 1894, was 300 feet wide, 20 feet deep, and, being 4 feet deeper and 11 miles shorter than the old one by Lake George, immediately became the traveled route for all shipping passing through St. Marys River. Night navigation was made fairly safe for a limited number of boats. Previous to the completion in 1897 of the rock section at Sailors Encampment and the deepening of the one at Middle Neebish to 21 feet, boats frequently grounded in mid-channel, but there has been no recurrence of such accidents during the past eight years. Work since 1898 has been applied to increasing the width of channel at critical places and to removing some isolated shoals that have been discovered in the meantime.

The river and harbor acts of June 13, 1902, and March 3, 1905, adopted a project which provided for a channel of 21 feet available depth at low water and 1,500 feet width from St. Marys Falls Canal to the upper entrance to Hay Lake (Little Rapids), thence a least width of 600 feet to the foot of Hay Lake, thence deepening to 21 feet the present 300-foot channel to Mud Lake via Middle Neebish, and opening a new 300-foot channel to Mud Lake via West Neebish, thus providing separate channels through this reach for up and down bound boats. The total expenditures to June 30, 1905, are \$3,512,686.96, leaving \$2,146,428.04 available for further payment.

Operations for the present fiscal year are as follows:

Removal of 500 cubic yards of bowlders from small shoals between the canal and Little Rapids by derrick boat.

In the Little Rapids the channel was deepened to 21 feet lowest stage of water, from foot of islands to Frechette Point, a distance of 8,000 feet, by removal of 282,217 cubic yards, bank measurement, of clay and sand from an area 300 to 450 feet wide. The dredging was begun May 7, 1904, and finished November 15, 1904. This part of the channel is now completed for a width of 600 feet.

From Frechette Point toward Six-Mile Point, for a distance of 6,500 feet, the channel was deepened to 21 feet for varying widths of 600 to 800 feet by removal of 484,414 cubic yards, bank measurement, of clay and sand. Dredging operations started May 7, 1904, will be completed by next December.

Removal of Nine-Mile Point shoal in Mid Hay Lake, covering an area 1,400 feet long by 500 to 950 feet wide, was completed to a depth of 22 feet on June 24, 1905, by removal of 70,608 cubic yards, bank measurement, of sand, bowlders, and hardpan.

The dredging of a new chanel 32,300 feet long, 300 feet wide, and 21 feet deep across the flats foot of Hay Lake to West Neebish under contract commencing May 13, 1904, was continued for a distance of 14,000

feet, the eight dredges employed removing 2,306,907 cubic yards, bank measurement. This section will be completed in 1906.

At West Neebish Rapids excavation was commenced September 9, 1904, of a channel 13,300 feet long, 22 feet deep, and 300 feet wide, with vertical sides through the rock. The main cofferdams, 9,000 feet apart, were completed, and the inclosure unwatered. A break in the upper main dam delayed the work six weeks in midwinter. There has been done 38,450 square feet of channeling, and 183,807 cubic yards of rock and 9,294 of earth excavated from an area 1,000 feet long.

The dredging of a new channel 19,300 feet long, 300 feet wide, and 21 feet deep across flats head of Mud Lake, commenced June 20, 1904, was continued for a distance of 10,000 feet, the three dredges employed removing 1,709,450 cubic yards, bank measurement. Completion in 1906.

Contracts have been recently made for widening entrance angle Middle Neebish, removal of Bayfield and adjacent shoals, and widening of channel foot of Little Mud Lake.

Section stakes and gauge boards were placed as needed for use of contractors.

### *Money statements.*

#### HAY LAKE CHANNEL.

July 1, 1904, balance unexpended.....	\$4, 838. 42
June 30, 1905, amount expended during fiscal year, for works of improvement.....	3, 075. 57
July 1, 1905, balance unexpended.....	1, 762. 85

#### MIDDLE AND WEST NEEBISH CHANNELS.

July 1, 1904, balance unexpended.....	\$1, 216, 195. 19
Amount appropriated by sundry civil act approved March 3, 1905....	1, 200, 000. 00
	2, 416, 195. 19
June 30, 1905, amount expended during fiscal year, for works of improvement.....	<sup>a</sup> 771, 530. 00
July 1, 1905, balance unexpended.....	1, 644, 665. 19
July 1, 1905, outstanding liabilities.....	233, 221. 00
July 1, 1905, balance available .....	1, 411, 444. 19
July 1, 1905, amount covered by uncompleted contracts.....	2, 949, 000. 00
Amount (estimated) required for completion of existing project.....	2, 000, 000. 00
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	
	1, 000, 000. 00

#### HAY LAKE AND NEEBISH CHANNELS.

Amount appropriated by river and harbor act approved March 3, 1905..	\$500, 000. 00
July 1, 1905, balance unexpended .....	500, 000. 00
Amount (estimated) required for completion of existing project.....	750, 000. 00

<sup>a</sup> Includes payments by Treasury Department account of Duluth, South Shore and Atlantic Railroad Company.....	\$6. 44
Michigan Central Railroad Company.....	12. 08

# ST MARYS RIVER, MICHIGAN.

Middle and West Neebish Channels, Project 1902.

Chas. E. L. B. DAVIS, Corps of Engineers, U. S. A.,  
in charge.

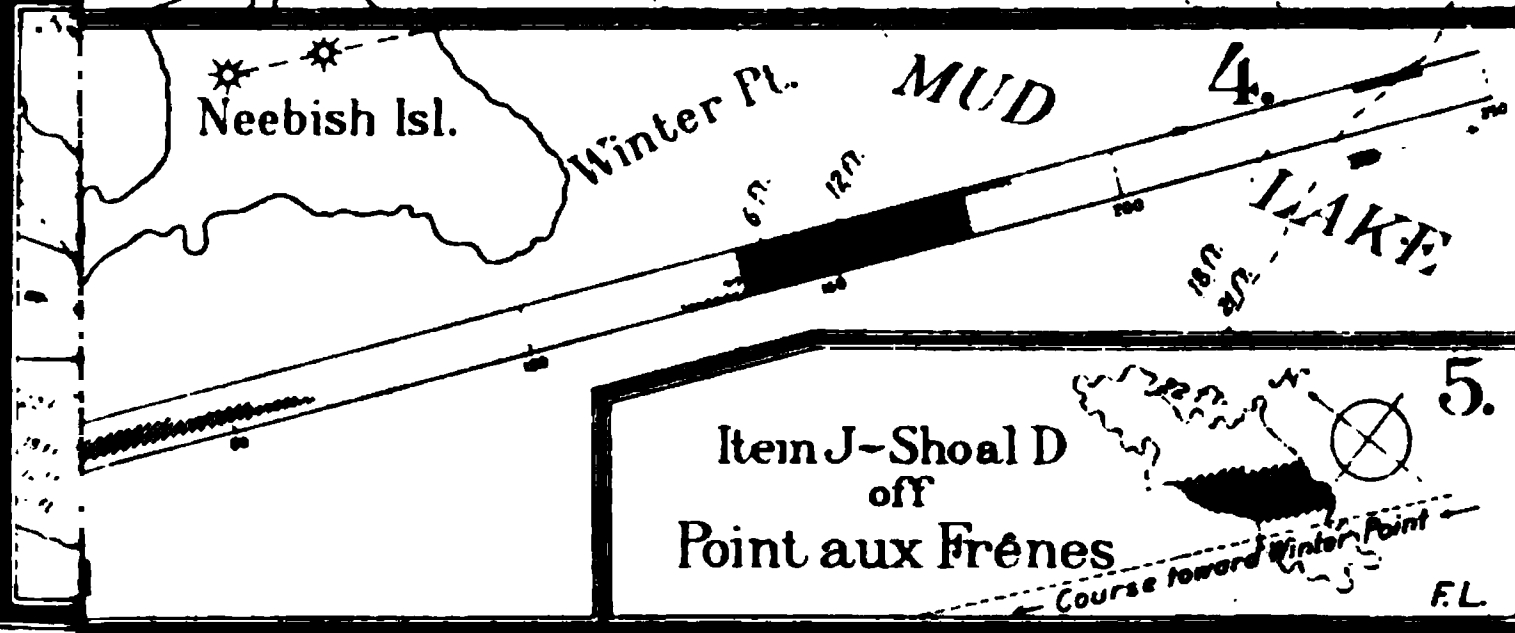
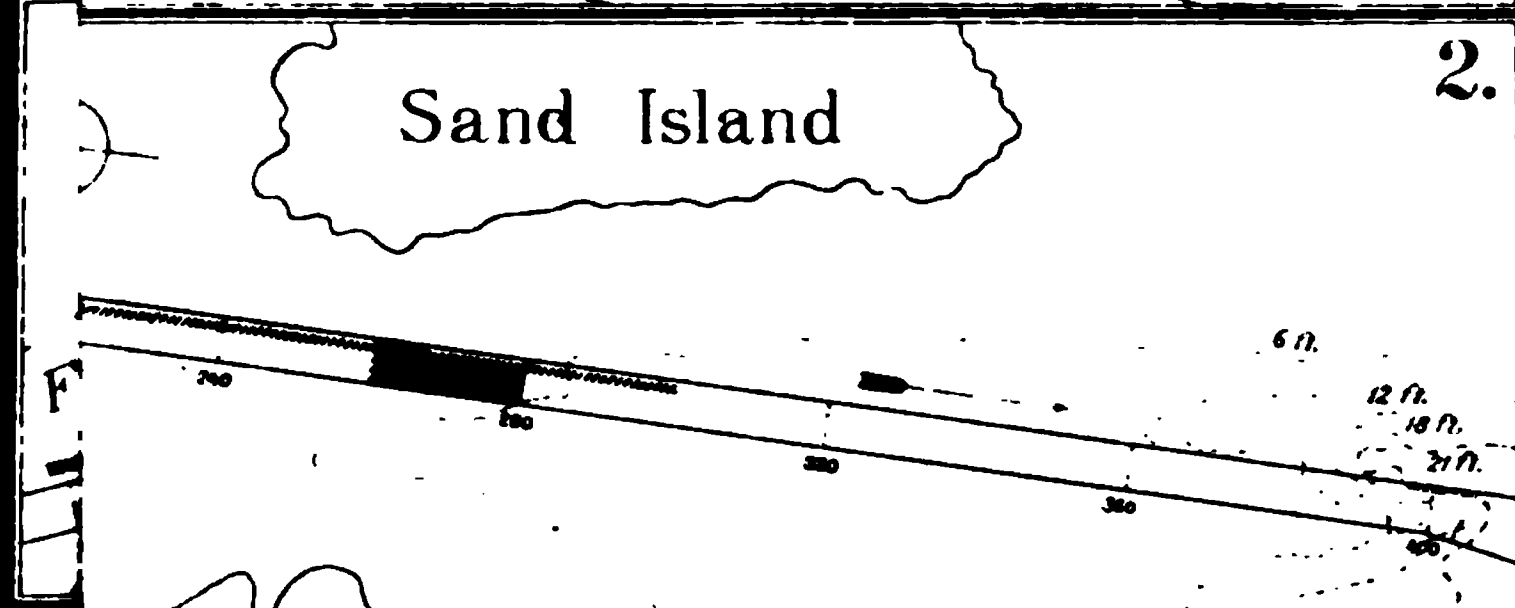
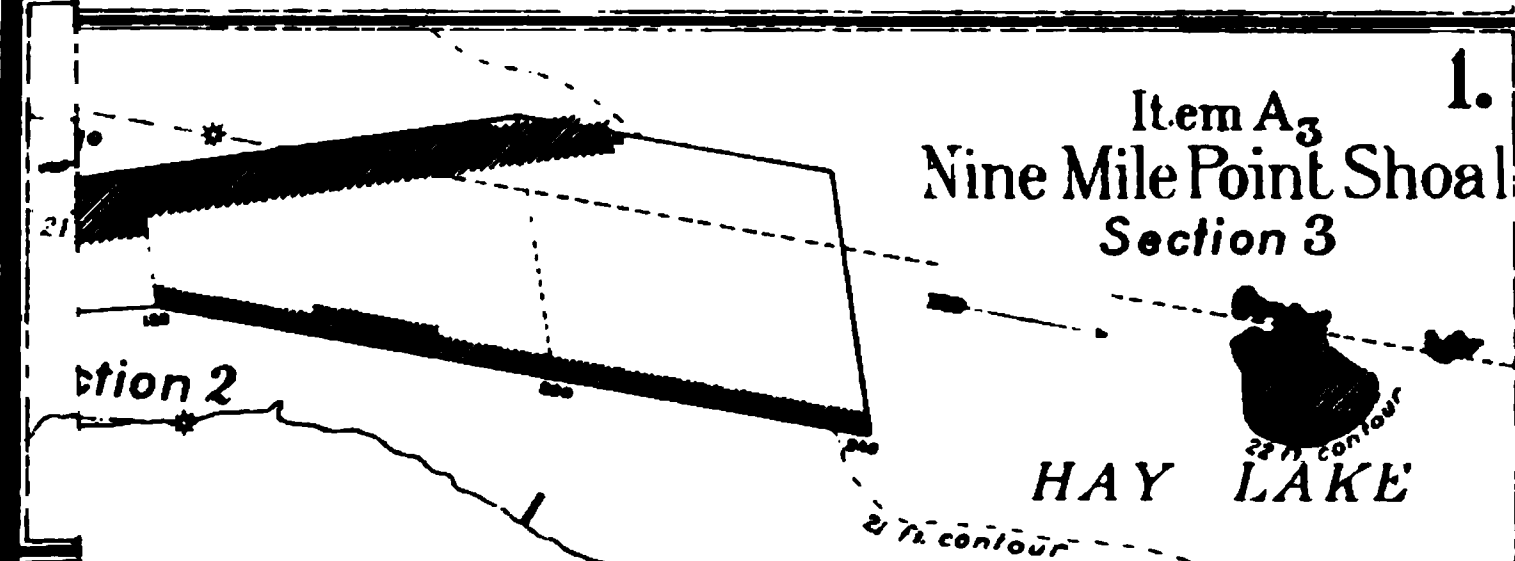
## MAP

Engineering Work done during fiscal year 1904~5.

Scale 1:30000.

0 500 1000 2000 3000 4000 5000 FT.

- Work done during fiscal year 1904~5.
- Work done prior to fiscal year 1904~5.





## APPROPRIATIONS.

*Hay Lake channel.*

August 2, 1882.....	\$200, 000
July 5, 1884.....	125, 000
August 5, 1886.....	150, 000
August 11, 1888.....	500, 000
September 19, 1890.....	400, 000
March 3, 1891 (sundry civil act).....	300, 000
August 5, 1892 (sundry civil act).....	115, 000
March 3, 1893 (sundry civil act).....	225, 000
August 18, 1894 (sundry civil act).....	150, 000
March 3, 1899.....	100, 000
June 6, 1900 (sundry civil act).....	250, 000
June 28, 1902 (sundry civil act).....	144, 115

*Middle and West Neebish channels.*

June 13, 1902.....	\$500, 000
March 3, 1903 (sundry civil act).....	800, 000
March 3, 1905 (sundry civil act).....	1, 200, 000

*Hay Lake and Neebish channels.*

March 3, 1905.....	\$500, 000
Total.....	5, 659, 115

## ABSTRACT OF CONTRACTS IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

*Contract dated April 7, 1904.*

Name of contractor: MacArthur Brothers Company, Chicago, Ill.

Amount and character of work: \$2,419,560; rock and earth excavation at West Neebish Rapids.

Price per unit: Cofferdam, \$20,000; earth excavation at 56 cents per cubic yard, bank measurement (full rate), and 28 cents per cubic yard, bank measurement (half rate); rock excavation, \$1.36 per cubic yard, bank measurement (full rate), and 68 cents per cubic yard, bank measurement (half rate); retaining walls at \$5.50 per square yard of channel face.

Date of approval: May 7, 1904.

Date of beginning of work: July 11, 1904.

Date of expiration: (One thousand two hundred good working days) about June 10, 1908.

*Contract dated April 11, 1904.*

Name of contractor: Charles Simono, Two Rivers, Wis.

Amount and character of work: \$56,494.43; dredging section 1, Little Rapids.

Price per unit: 17½ cents per cubic yard, bank measurement (full rate), and 8½ cents per cubic yard, bank measurement (half rate).

Date of approval: April 22, 1904.

Date of beginning of work: May 1, 1904.

Date of expiration: (Two hundred good working days) about May 24, 1905. Completed November 15, 1904.

*Contract dated April 11, 1904.*

Name of contractor: H. W. Hubbell & Co., Saginaw, Mich.

Amount and character of work: \$67,404 (estimated); dredging section 3, Nine-mile Point.

Price per unit: 98.4 cents per cubic yard, bank measurement (full rate), and 49.2 cents per cubic yard, bank measurement (half rate).

Date of approval: April 18, 1904.

Date of beginning of work: May 1, 1904.

## 2272 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Date of expiration: (Two hundred good working days) about June 15, 1905. Completed June 7, 1905.

*Contract dated April 11, 1904.*

Name of contractor: Samuel O. Dixon, Milwaukee, Wis.

Amount and character of work: \$685,312.50 (estimated); dredging section 1, Hay Lake.

Price per unit: 12½ cents per cubic yard, bank measurement (full rate), and 6½ cents per cubic yard, bank measurement (half rate).

Date of approval: April 18, 1904.

Date of beginning of work: September 1, 1904.

Date of expiration: (Five hundred good working days) about October 17, 1906.

*Contract dated April 14, 1904.*

Name of contractor: The Lake Erie Dredging Company, Buffalo, N. Y.

Amount and character of work: \$131,812.50; dredging section 2, Little Rapids.

Price per unit: 13½ cents per cubic yard, bank measurement (full rate), and 6½ cents per cubic yard, bank measurement (half rate).

Date of approval: April 27, 1904.

Date of beginning of work: May 1, 1904.

Date of expiration: (Three hundred and fifty good working days) about November 22, 1905.

*Contract dated April 16, 1904.*

Name of contractor: Chicago and Great Lakes Dredge and Dock Company, Chicago, Ill.

Amount and character of work: \$466,915.50; dredging section 2, Mud Lake.

Price per unit: Soft material, at \$0.129 per cubic yard, bank measurement (full rate), and \$0.0645 per cubic yard, bank measurement (half rate). Hard material, at \$0.98 per cubic yard, bank measurement (full rate), and \$0.49 per cubic yard, bank measurement (half rate). Rock, at \$8.25 per cubic yard, bank measurement (full rate), and \$4.125 per cubic yard, bank measurement (half rate).

Date of approval: May 6, 1904.

Date of beginning of work: September 1, 1904.

Date of expiration: (Five hundred good working days) about October 17, 1906.

*Emergency contract dated March 14, 1905.*

Name of contractor: J. A. Lamontagne, Sault Ste. Marie, Mich.

Amount and character of work: \$536.95; furnishing piles.

Price per unit: 6 cents per linear foot for piles 20 feet long; 7 cents per linear foot for piles 25 feet long; 8 cents per linear foot for piles 30 feet long; 9 cents per linear foot for piles 35 feet long; 10 cents per linear foot for piles 40 feet long.

Date of beginning of work: March 24, 1905.

Date of expiration: June 20, 1905. Completed May 29, 1905.

*Emergency contract dated June 5, 1905.*

Name of contractor: Frank Perry, Sault Ste. Marie, Mich.

Amount and character of work: \$4,805.15 (estimated); furnishing hemlock timber.

Price per unit: \$17.30 per M feet board measure for pieces 14 to 24 feet long, and \$19.45 per M feet board measure for pieces 26 to 32 feet long.

Date of beginning of work: June 15, 1905.

Date of expiration: August 1, 1905.

*Emergency contract dated June 13, 1905.*

Name of contractor: The Soo Lumber Company, Sault Ste. Marie, Mich.

Amount and character of work: \$5,158.75 (estimated); furnishing fir timber.

Price per unit: \$25.75 per M feet board measure.

Date of beginning of work: June 23, 1905.

Date of expiration: July 20, 1905.



## REPORT OF MR. JOSEPH RIPLEY, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,  
*Sault Ste. Marie, Mich., July 1, 1905.*

COLONEL: I have the honor to submit the following report of operations for improving Hay Lake and Neebish channels during the fiscal year ending June 30, 1905:

## REMOVAL OF BOWLDERS FROM ISOLATED SHOALS, CANAL TO LITTLE RAPIDS.

Emergency contract dated April 26, 1904, with H. W. Hubbell & Co., of Saginaw, Mich., for hire of steam derrick boat; contract rates, \$6.15 per working hour, and 18 cents per pound for dynamite.

The derrick boat worked 208.8 hours and was delayed 5.9 hours, and picked up 500 cubic yards of bowlders, besides washing away numerous spots with water jet. Thirty-five pounds of dynamite were used. The total cost amounted to \$1,290.32.

## WIDENING AT LITTLE RAPIDS.

*Section 1, Item B.*—Improving upper entrance channel to Hay Lake from above islands to Frechette Point, a distance of 14,000 feet, for a width of 300 to 450 feet, by deepening to 21 feet at low stage of water of 579.9. The original improvement of 1892 was for 20-foot depth at mean stage of water of 583.3.

Contract dated April 11, 1904; Charles Simono, Two Rivers, Wis., contractor; rates, 17½ cents per cubic yard, bank measurement, to 21-foot grade, and 8½ cents per cubic yard between 21 and 22 foot grades. Material: Clay and sand.

Dredging commenced May 7, 1904, and was completed November 15, 1904. Two dredges worked 1,731.6 hours and were delayed 516.1 hours, and excavated 282,217 cubic yards, bank measurement, from an area of 604,000 square yards.

The excavated material was dumped in Bay de Wasig.

A survey was made through the ice during February, 1905, for final estimate, and check computations of quantities were made from the soundings.

Total amount paid the contractor on this section was \$56,349.68 for dredging 239,628 cubic yards full rate and 155,670 cubic yards half rate material.

*Section 2, Item B.*—Improving channel between Frechette and Six-Mile Points, a distance of 12,000 feet for varying widths of 600 to 1,700 feet, by deepening to 21 feet at low stage of water of 579.4 from former improvement of 20 feet depth at mean stage of 583.0.

Contract dated April 14, 1904; The Lake Erie Dredging Company, Buffalo, N. Y., contractors; rates, 13½ cents per cubic yard, bank measurement, to 21-foot grade, and 6½ cents per cubic yard between 21 and 22 foot grades. Material: Clay and sand.

Dredging commenced May 7, 1904. Three dredges worked 3,332.5 hours, and were delayed 727.1 hours, and from an area of 389,000 square yards excavated 635,262 cubic yards, scow measurement, which was deposited in Bay de Wasig. The estimated bank measurement is 484.414 cubic yards; this is divided into 442,421 cubic yards full rate and 41,993 cubic yards half rate. A survey was made during February, 1905, for a season's estimate, and computations made for check on estimated bank measurement. About 45 per cent of the dredging has been done in 56 per cent of the contract time of 350 good working days.

## DEEPENING NINE-MILE POINT SHOAL.

*Section 3, Item A.*—Removal of shoals in Mid Hay Lake, covering an area of 1,400 feet long by 500 to 950 feet wide, to a depth of 22 feet at low-water stage of 579.3, from previous improved depth of 21 feet at mean stage of 583.0.

Contract dated April 11, 1904; H. W. Hubbell & Co., Saginaw, Mich., contractors; rates, 98.4 cents per cubic yard, bank measurement, to 22-foot grade, and 49.2 cents per cubic yard between 22 and 23 foot grades. Material: Bowlders, stones, sand, and hard pan. Dredging commenced May 11, 1904, and was completed on June 7, 1905. Three dredges and one derrick boat worked at varying times 2,434.4 hours and were delayed 845.6 hours, and excavated 76,928 cubic yards, scow measurement, estimated at 70,608 cubic yards, bank measurement. The total excavation made under the contract has been divided into 56,188 cubic yards full-rate and 23,737 cubic yards half-rate material, but the final estimate computations may add about 1,000 cubic yards to the half-rate material. The shoal was swept over with the sounding raft with bars suspended at established grade and the work accepted on June 24, 1905. One hundred per cent of the work has been done with an expenditure of 100 per cent of the time.



## FLATS HAY LAKE ENTRANCE TO WEST NEEBISH.

*Section 1, Item F.*—Excavating a channel 300 feet wide at the bottom, with side slopes of 1 on 2 for a distance of 32,282 feet to a depth of 21 feet at low-water stage of 579.3, through the flats at foot of Hay Lake, on the main part of which the original depth of water was 2 to 10 feet.

Contract dated April 11, 1904; Samuel O. Dixon, Milwaukee, Wis., contractor; rates, 12½ cents per cubic yard, bank measurement, to 21-foot grade, and 6½ cents per cubic yard between 21 and 22 foot grades. Material: Silt, sand, and clay. First dredge commenced work May 13, 1904. Eight dredges have been employed at various times during the past fiscal year and worked 11,057.2 hours and were delayed 2,575.2 hours, and from an area of 538,000 square yards excavated 2,586,737 cubic yards of material, scow measurement, which was deposited on dumping ground near Sugar Island. This amount has been verified by a survey made in January, 1905, and the amount of material excavated during April, May, and June, 1905, scow measurement, reduced to bank measurement, added to computed amount, gives a total for the year of 2,306,907 cubic yards, and a grand total for the section of 2,422,339 cubic yards. Contract date for beginning the work, September 1, 1904. About 44 per cent of the work has been done at an expenditure of 25 per cent of the time.

## EXCAVATING AT WEST NEEBISH RAPIDS.

*Course 6, Item G.*—Construction of a channel 300 feet wide and 22 feet deep at low-water stage of 578.8 for a distance of 13,300 feet through the rapids, with a stone retaining wall along each edge of the rock cut. The water is only a few inches deep over a considerable part of the rock section.

Contract dated April 7, 1904, with MacArthur Brothers Company, of Chicago, Ill., contractors; rates, \$1.36 per cubic yard, bank measurement, for rock, and 56 cents for earth to 22-foot grade, and 68 cents for rock and 28 cents for earth between 22 and 23 foot grades; also \$5.50 per square yard of channel surface for retaining walls. Material: Limestone rock, sand, clay, gravel, stones, boulders, and hard pan.

For convenience of classification all material between cross sections 210 and 1066 will be paid for as rock and all the remainder as earth.

Work was begun on May 16, 1904, but the actual work of excavating was not commenced until September 9, 1904. The number of men employed has averaged 183 for 3,174.5 working hours. Delays amounted to 175.5 hours.

There has been used 126,902 pounds of dynamite for blasting. Thirty-eight thousand four hundred and fifty square feet of channeling has been done. Nineteen thousand two hundred and forty-three holes were drilled.

On February 15 a break occurred in the upper main dam, and the work of excavation was discontinued, to be resumed again on March 27, 1905.

The actual amount of excavation to date is 181,083 cubic yards full rate, and 2,724 cubic yards half rate, as shown by accurate survey. To this must be added 9,293 cubic yards of dredge material. This is 10 per cent of the work with an expenditure of 22 per cent of the time.

The plant employed consists of four cableways and one steam shovel for excavation, compressor plant, and all the necessary auxiliary plant, channelers, drills, pumps, etc.

The work is being done by Grant, Smith & Co. Three dredges worked at various times from July 1 to December 8, 1904, on main dam. A night shift of men was started with two cableways on June 10, with an average force of 120 men.

One dredge commenced work on the earth section on April 26 and worked 603.1 hours, and was delayed 65.2 hours, and excavated 13,276 cubic yards, scow measurement, equivalent to 9,293 cubic yards, bank measurement.

## EXCAVATING AT MUD LAKE.

*Section 2, Items H. J.*—Making a new channel 300 feet wide and 19,272 feet long across flats off Winter Point, to a depth of 21 feet, and removal of four small isolated shoals in Mud Lake to a depth of 22 feet below the low-water stage of 578.8.

Contract dated April 16, 1904, with Chicago and Great Lakes Dredge and Dock Company, contractors; rates, 12.9 cents per cubic yard, bank measurement, for soft material to 21-foot grade, and 6.45 cents per cubic yard between 21 and 22 foot grades; 98 cents for hard material, and \$8.25 for the rock to the 22-foot grade, and 49 cents for hard material and \$4.125 for rock between 22 and 23 foot grades. Material: Clay, sand, silt, stone, boulders, hardpan, and limestone rock.

Operations were commenced June 20, 1904. Three dredges worked at various times during the year operating 5,065 hours, and were delayed 985.1 hours, and from an area of 287,000 square yards excavated 2,079,416 cubic yards, scow measurement, which was deposited in Munuscong Bay. This amount has been verified by a survey made in January, 1905, and to the quantity thus obtained was added the estimated bank measurement for April, May, and June, 1905. This gives a total excavation for the year for the section of 1,628,955 cubic yards of full-rate material, and 80,495 cubic yards of half-rate material; also some unestimated half-rate material. The work is 50 per cent completed with an expenditure of 25 per cent of the time. One dredge besides the above worked on a pilot cut through the shoal water, working 849.8 hours, and delayed 175.3 hours, and cast over material estimated at 112,445 cubic yards. Contract date for commencing work, September 1, 1904.

There were about 400 stakes driven and 25 gauge boards placed for the use of the several contractors, and numerous marker buoys placed to mark limits of dumping grounds.

At the end of June, 1905, there were fourteen dredges working on the river, and four more will be ready to start at work early in July.

#### SURVEYS.

The following surveys were completed during the year: Widening at angles, courses 4 and 5, courses 5 and 6, and courses 7 and 8, West Neebish; courses 5 and 6, Middle Neebish; also unsurveyed area, upper end of Item B, section 2, Little Rapids, In all 12,700 soundings were taken.

A survey of the deep-water area between courses 6 and 7, West Neebish Channel, was made with sweeping raft, and 145 contour buoys placed and read in from triangulation stations. Area covered one-half square mile.

Section 1, Item B, was swept over with raft bars suspended at established grade, and section accepted.

New triangulation stations were located and read in, and co-ordinates computed at Canadian government dock and Carbide dock. Old tripods were replaced with new ones on all stations where needed. One hundred and twenty buoy floats were made during stormy weather.

A three-auger party began a survey on January 9 and remained out until March 9. During this time 116,000 soundings were taken on the following areas: Courses 4 and 5, season's estimate; course 6, monthly surveys in January, May and June; course 7 and a portion of course 8; courses 2 and 3, and Nine-mile shoals. Also strip 50 by 5,000 feet between new location of ranges at Six-mile Point. Original surveys covering shoals off turning beacon Mud Lake, Twin Island, and Point aux Frenes; also on the Canadian side of the river the areas in vicinity of Canadian government dock, New Ontario dock, and the steel plant dock. All of the above soundings were reduced and mapped, and all necessary computations for season's and final estimates made.

A line of levels was run from B. M. Hinds to the shore of Hay Lake, and a reference point established. Also line from B. M. 82 to B. M. 88 and intermediate bench marks established to control the excavation through the West Neebish Rapids. Area around upper end of Little Mud Lake was swept with raft to ascertain if anchor lost by *Tionesta* projected above grade. Breaks in the Middle Neebish and Little Rapids dikes were repaired.

Specifications for steel tug 73 feet long, 15 feet beam, and 8 feet depth of hold were prepared, information for the same being collected from shipyards in Detroit and Port Huron. Contract was made with the Craig Shipbuilding Company, of Toledo, Ohio, for construction.

A scowman employed on Starke dredge No. 8 fell overboard October 29 and was drowned.

Junior Engineer L. P. Morrison was in immediate charge of the river work.

Very respectfully, your obedient servant,

JOSEPH RIPLEY,  
*Assistant Engineer.*

Lieut. Col. CHAS. E. L. B. DAVIS,  
*Corps of Engineers.*

## O O 5 .

## IMPROVEMENT OF ST. CLAIR FLATS CANAL, MICHIGAN.

The history of this improvement to June 30, 1896, is outlined in the Report of the Chief of Engineers for that year, pages 2881-2889, no work having been done from 1896 up to 1901, inclusive, the then existing projects having been completed.

The river and harbor act of June 13, 1902, contained new provisions to authorize the construction of a second channel similar to the one already in use and parallel to it, but separated therefrom by a dike of about 100 feet width, so as to provide a channel of 20 feet minimum depth and about 300 feet width from Lake St. Clair up into St. Clair River for ascending boats and a similar channel for descending boats.

When work was commenced under the new project there was an unexpended balance of former appropriations of \$2,159.39 which, added to the new appropriation, made a total amount available of \$332,159.39.

The total expenditures under new projects up to June 30, 1905, amount to \$83,975.68, leaving \$248,183.71 still available for further work, exclusive of the \$85,000 diverted from St. Marys River appropriation.

The M. Rabbitt & Sons Company, contractors for the construction of the new channel, commenced work on July 15, 1904. At the end of the fiscal year the new channel had been dredged to a width of 150 feet and a depth of 18 feet for a length of 4,317 feet; and 2,558 feet of pier revetment had been built.

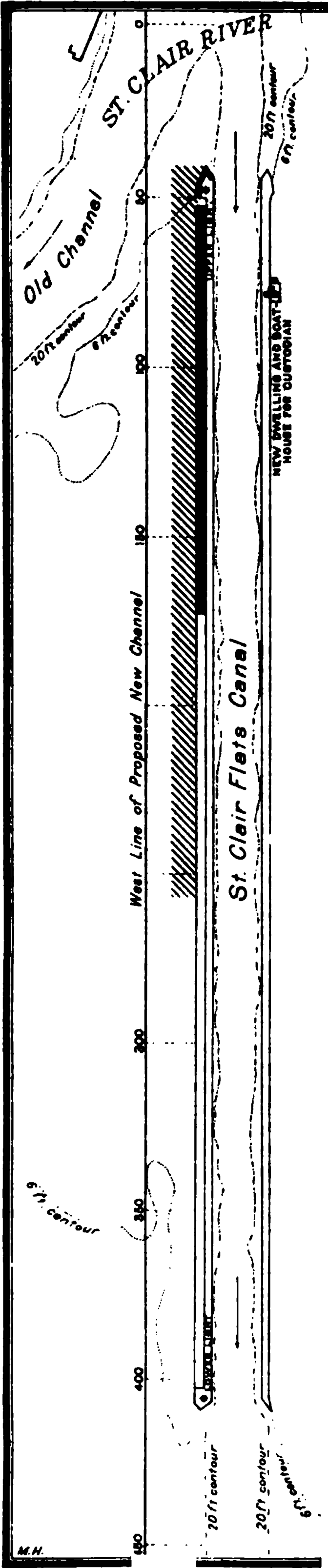
The amount of commerce passing through the canal during the season of 1904 was 38,044,929 tons of 2,000 pounds, its estimated value being \$403,276,247.40. These statistics were compiled by Mr. E. S. Wheeler, whose full report, dated April 13, 1905, is appended to the report on the improvement of the Detroit River.

The general supervision of this work has been in charge of Chief Assistant Engineer E. S. Wheeler.

*Money statement.*

July 1, 1904, balance unexpended .....	\$328, 908. 94
June 30, 1905, amount expended during fiscal year, for works of improvement .....	" 80, 725. 23
July 1, 1905, balance unexpended .....	248, 183. 71
July 1, 1905, outstanding liabilities .....	40, 044. 00
July 1, 1905, balance available .....	<sup>b</sup> 208, 139. 71
July 1, 1905, amount covered by uncompleted contracts .....	254, 316. 00
" Actual expenditures during the year .....	\$81, 106. 81
Deduct amount received from sale of old drift bolts December 22, 1904 ..	381. 58
Net expenditures during the year .....	80, 725. 23

<sup>b</sup> This does not include, however, the \$85,000 (estimated) diverted from the appropriation for improving St. Marys River at the falls by act of June 13, 1902.





## APPROPRIATIONS.

June 23, 1866.....	\$80,000	March 3, 1879.....	\$3,000
March 2, 1867.....	150,000	June 14, 1880.....	2,500
July 25, 1868.....	86,000	August 5, 1886.....	18,750
April 10, 1869.....	142,560	August 11, 1888.....	75,000
July 11, 1870.....	16,500	September 19, 1890.....	80,000
March 3, 1871.....	1,500	June 13, 1902.....	330,000
June 10, 1872.....	4,000		
March 3, 1873.....	100,000	Total .....	1,094,810
June 18, 1878.....	5,000		

NOTE.—The appropriations of 1852, \$20,000, and 1856, \$45,000, are not taken account of, for the reason that they did not enter into the improvement of St. Clair Flats Canals, the first having been expended in building a dredge and the second in dredging the north channel of the South Pass. From March 3, 1881, the amounts allotted for operating and care of St. Clair Flats Canal are rendered separately.

## ABSTRACT OF CONTRACT IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1904.

*Contract dated June 11, 1904.*

Name of contractor: The M. Rabbitt & Sons Company, Toledo, Ohio.

Amount and character of work: \$361,699.88; constructing new channel.

Price per unit: Excavation, 8½ cents per cubic yard, bank measurement; hemlock (sheet piles), \$45 per M feet B. M.; white pine and hemlock (stringers), \$42 per M feet B. M.; oak (waling), \$50 per M feet B. M.; round piles, 40 cents per linear foot; tie-rods, bolts, and spikes, 6 cents per pound.

Date of approval: June 29, 1904.

Date of beginning work: September 3, 1904.

Date of expiration: September 3, 1906.

## REPORT OF MR. E. S. WHEELER, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,  
*Detroit, Mich., June 30, 1905.*

COLONEL: I have the honor to submit the following report of operations under my charge connected with the improvement of St. Clair Flats Canal:

The M. Rabbitt & Sons Company began work on July 15, 1904. Their plant includes 1 hydraulic dredge with 2,000 linear feet of pipe, and pontoons, 2 pile drivers, 1 tug, floating machine shop, divers' outfit, pneumatic auger and hammers, etc. A second hydraulic dredge arrived in June.

They have completed the pier work around the upper light-house and about 2,558 feet of revetment. One-half of the remaining tie-rods are placed in the pier. About one-third of the timber work is now completed and the contractors have on the ground sufficient timber for 3,000 linear feet of revetment.

The contractors have excavated 328,789 cubic yards of material, which is about one-sixth of the total amount. With their increased and improved plant the rate of excavation is now about four times as great as it was during the season of 1905, and if maintained will complete the work within the time limits of the contract.

Very respectfully,

E. S. WHEELER,  
*Chief Assistant Engineer.*

Lieut. Col. CHAS. E. L. B. DAVIS,  
*Corps of Engineers.*

O O 6.

OPERATING AND CARE OF ST. CLAIR FLATS CANAL, MICHIGAN.

During the fiscal year the custodian and one assistant have continued the routine work of enforcing the rules and regulations for the navigation of the canal and reading water gauges.

Under formal contract dated September 16, 1904, the building of a custodian's dwelling and boathouse was awarded to Charles-S. Rose and Frank X. Pouliot, of Marine City, for the sum of \$3,757.

The amount of commerce passing through the canal during the season of 1904 was 38,044,929 tons of 2,000 pounds, its estimated value being \$403,276,247.40.

These statistics were compiled in the same manner as last year, and the full report of Mr. Wheeler, dated April 13, 1905, is appended to the report on the improvement of the Detroit River.

The supervision of the work pertaining to the canal has been in charge of Chief Assistant Engineer E. S. Wheeler.

*Summary of expenses for operating and care of St. Clair Flats Canal, Michigan, for the fiscal year ending June 30, 1905.*

Pay rolls (routine work) .....	\$1,926. 57
Materials (routine care and repair) .....	317. 09
Contingencies (routine work) .....	2,010. 92
Office building .....	4,880. 72
Repairs to dikes and piers .....	8,792. 57
Supervision and contingencies .....	2,388. 46
Total .....	20,316. 33

*Money statement.*

Expenditures to June 30, 1904 .....	\$107,881. 33
Outstanding liabilities June 30, 1904 .....	8,855. 10
	116,736. 43
Expended during fiscal year ending June 30, 1905 .....	\$28,823. 79
Deduct outstanding liabilities June 30, 1904 .....	8,855. 10
	19,968. 69
Add outstanding liabilities June 30, 1905 .....	347. 64
	20,316. 33
Total expenses to June 30, 1905 (including outstanding liabilities) .....	137,052. 76

*Expenses for operating and care of St. Clair Flats Canal, Michigan.*

1882 .....	\$8,786. 69	1895 .....	\$1,993. 32
1883 .....	5,668. 87	1896 .....	2,501. 57
1884 .....	2,532. 15	1897 .....	2,162. 81
1885 .....	4,906. 59	1898 .....	2,099. 65
1886 .....	9,539. 11	1899 .....	2,399. 78
1887 .....	1,819. 53	1900 .....	3,348. 15
1888 .....	1,510. 00	1901 .....	3,053. 23
1889 .....	20,315. 00	1902 .....	2,121. 97
1890 .....	2,158. 16	1903 .....	5,975. 85
1891 .....	2,020. 20	1904 .....	23,667. 02
1892 .....	1,888. 67	1905 .....	20,316. 33
1893 .....	2,675. 93		
1894 .....	3,592. 18	Total .....	137,052. 76

*Estimate.*

Amount (estimated) for fiscal year ending June 30, 1906.....	\$11,000
Balance from allotment for preceding year (in round numbers).....	8,000
	<hr/>
Additional allotment required for fiscal year ending June 30, 1906.....	3,000

*Statement of receipts and expenses for fiscal year ending June 30, 1905.*

Receipts:	
Balance at close of fiscal year ending June 30, 1904 .....	\$18,538.09
Allotment July 18, 1904.....	10,500.00
	<hr/>
	29,038.09
Expenses .....	20,316.33
	<hr/>
Balance at close of fiscal year ending June 30, 1905 .....	8,721.76

## ABSTRACT OF CONTRACTS IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

*Emergency contract dated June 18, 1904.*

Name of contractor: A. J. Dupuis Company, Detroit, Mich.  
Amount and character of work: \$900; hire of pile-driver plant.  
Price per unit: \$5 per working hour.  
Date of beginning of work: June 28, 1904.  
Date of expiration: About July 20, 1904; completed July 16, 1904.

*Emergency contract dated July 27, 1904.*

Name of contractor: Charles Boston & Sons, Delray, Mich.  
Amount and character of work: \$885.87; hire of pile-driver plant.  
Price per unit: \$4.75 per working hour.  
Date of beginning of work: August 6, 1904.  
Date of expiration: About August 26, 1904; completed August 27, 1904.

*Formal contract dated September 16, 1904..*

Names of contractors: Charles S. Rose and Frank X. Pouliot, Marine City, Mich.  
Amount and character of work: \$3,757; constructing custodian's dwelling and boathouse.  
Price: Lump sum of \$3,757.  
Date of beginning of work: October 17, 1904.  
Date of expiration: Indefinite; completed May 31, 1905.

## REPORT OF MR. E. S. WHEELER, CHIEF ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,  
*Detroit, Mich., June 30, 1905.*

COLONEL: I have the honor to submit the following report of operations under my charge during the fiscal year ending June 30, 1905, connected with the operating and care of the St. Clair Flats Canal, Michigan:

The canal has been under the immediate charge of Custodian William Mott until the 1st of April, when he was succeeded by Horace Smith. The custodian has looked after the enforcement of the rules in the usual manner.

Repairs have been completed on 2,200 linear feet of lower end of east dike.



The dwelling house, office, and boathouse for the custodian have been completed. A small gasoline launch has been purchased for the custodian's use in communicating with vessels.

The water-gauge record has been kept without interruption during the year.

The amount of commerce passing the canal has been compiled in the same manner as last year. The total freight during the season of 1904 is found to be 38,045,929 tons of 2,000 pounds each, its estimated value being \$403,276,247.40.

Very respectfully,

E. S. WHEELER,  
*Chief Assistant Engineer.*

Lieut. Col. CHARLES E. L. B. DAVIS,  
*Corps of Engineers.*

## O O 7.

### IMPROVEMENT OF DETROIT RIVER, MICHIGAN.

The river and harbor act of June 13, 1902, appropriated \$500,000 for carrying out a project of improvement designated as "Plan A," of which amount the Secretary of War was authorized to expend \$10,000 in the river north and west of Grosse Isle for the deepening of the channel to Wyandotte, Mich., with the proviso that contracts may be entered into for such materials and work as may be necessary to prosecute said project, not to exceed in the aggregate \$1,750,000. Continuing contracts have now been made to the extent of work thus authorized.

Operations under this project were continued during the fiscal year as follows:

Under contract, work was commenced on July 29, 1904, on the west half of a 600-foot channel at Lime Kiln Crossing, the object being to straighten and to deepen the channel to 21 feet at a Lake Erie stage of 570.8 feet, but taking advantage of former improvements, involving the removal of about 140,000 cubic yards. There were removed 30,581 cubic yards of limestone bedrock, all requiring to be drilled and blasted.

Under contract, dredging was commenced on May 24, 1904, on Amherstburg Reach and Hackett Range, the object being to provide a clear depth of 21 feet for widths of 300 to 600 feet, straightening the channel, but taking advantage of former improvements, involving the removal of about 500,000 cubic yards. Up to June 30, 1905, there had been removed 186,653 cubic yards of limestone bedrock, loose stones and bowlders, clay, and sand, of which amount 179,153 cubic yards were removed during the fiscal year. Drilling and blasting were necessary in the removal of about 60 per cent of this material.

Under a contract for dredging at Bar Point shoals between September 27 and November 22, 1904, for the purpose of determining the nature of the material, there were removed 8,226 cubic yards of sand, clay, small stones, and hardpan.

Under contract, dredging was commenced on April 20, 1905, at Bar Point shoals, the object being to provide a clear depth of 21 feet for a width of 400 feet or more, involving the removal of about 1,300,000 cubic yards. There were removed 251,674 cubic yards of sand, clay, silt, and small bowlders.

In addition to the contract work, a derrick scow with diving plant belonging to the United States was operated by hired labor from July 1 to October 21, 1904, and from May 12 to June 30, 1905, removing 660 cubic yards of bowlders from an area of some 275,000 square yards between the head of Ballards Reef and Bar Point, where the sweeping raft disclosed points in the channel having less than the required 21 feet depth.

Sweeping by raft over channel areas and surveys, both general and special, were continued, and water-gauge readings were automatically recorded at Amherstburg during the year, and the results transmitted to the lake survey office.

These works were under the local supervision of Assistant Engineer Charles Y. Dixon, to whose detailed report attention is invited, particularly to the present condition of the channel as the result of past improvements, a condensed statement of which is not attempted.

The commerce through the Detroit River during the calendar year 1904 amounted to nearly 42,800,000 freight tons, as shown by the subjoined report of Chief Assistant Engineer E. S. Wheeler.

Money statement.

July 1, 1904, balance unexpended .....	\$909, 358. 22
Amount appropriated by sundry civil act approved March 3, 1905 .....	500, 000. 00
	<hr/>
	1, 409, 358. 22
June 30, 1905, amount expended during fiscal year, for works of im- provement .....	372, 520. 18
	<hr/>
July 1, 1905, balance unexpended .....	1, 036, 838. 04
July 1, 1905, outstanding liabilities .....	149, 650. 00
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July 1, 1905, balance available .....	887, 188. 04
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July 1, 1905, amount covered by uncompleted contracts .....	1, 095, 328. 00
	<hr/>
Amount (estimated) required for completion of existing project .....	700, 000. 00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unex- pended July 1, 1905 .....	700, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATIONS.

June 23, 1874.....	\$25, 000	June 3, 1896.....	\$30, 000
June 18, 1878.....	100, 000	March 3, 1899 .....	100, 000
March 3, 1879 .....	50, 000	June 6, 1900 (sundry civil act) .	200, 000
June 14, 1880.....	50, 000	March 3, 1901 (sundry civil act)	325, 000
March 3, 1881 .....	50, 000	June 13, 1902.....	500, 000
August 2, 1882.....	60, 000	June 28, 1902 (sundry civil act)	136, 500
July 5, 1884 .....	200, 000	March 3, 1903 (sundry civil act)	450, 000
August 5, 1886.....	37, 500	March 3, 1905 (sundry civil act)	500, 000
August 11, 1888.....	130, 500		
July 13, 1892.....	30, 000		
August 18, 1894.....	30, 000		
		Total .....	3, 004, 500

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ABSTRACT OF CONTRACTS IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

*Contract dated April 5, 1904.*

Name of contractor: G. H. Breymann & Bro., Toledo, Ohio.  
Amount and character of work: \$430,625 (estimated); dredging section 2 Lime Kiln Crossing.  
Price per unit: \$3.25 per cubic yard, bank measurement (full rate), and \$1.62½ per cubic yard, bank measurement (half rate).  
Date of approval: April 14, 1904.  
Date of beginning of work: June 20, 1904.  
Date of expiration: (Four hundred good working days) about July 7, 1906.

*Emergency contract dated April 15, 1904.*

Name of contractor: J. H. & D. Sullivan, Detroit, Mich.  
Amount and character of work: \$3,788.40; hire of tug *Quickstep*.  
Price per unit: \$574 per calendar month.  
Date of beginning of work: April 25, 1904.  
Date of expiration and completion: November 17, 1904.

*Contract dated May 31, 1904.*

Name of contractor: M. Sullivan, Detroit, Mich.  
Amount and character of work: \$804,000 (estimated); dredging section 4, Amherstburg Reach and Hackett Range.  
Price per unit: \$2.40 per cubic yard, bank measurement (full rate), and \$1.20 per cubic yard, bank measurement (half rate).  
Date of approval: June 13, 1904.  
Date of beginning of work: August 15, 1904.  
Date of expiration: (Five hundred good working days) about May 15, 1907.

*Contract dated September 27, 1904.*

Name of contractor: Muir-O'Sullivan Dredge and Dock Company, Port Huron, Mich.  
Amount and character of work: \$5,390; time work by dredging plant.  
Price per unit: \$20 per working hour.  
Date of approval: October 21, 1904.  
Date of beginning of work: November 4, 1904.  
Date of expiration and completion: November 22, 1904.

*Contract dated March 2, 1905.*

Name of contractor: G. H. Breymann & Bros., Toledo, Ohio.  
Amount and character of work: \$324,000 (estimated); dredging Bar Point shoals.  
Price per unit: 27 cents per cubic yard, scow measurement.  
Date of approval: March 17, 1905.  
Date of beginning of work: May 20, 1905.  
Date of expiration: (Four hundred good working days) about June 7, 1907.

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REPORT OF MR. E. S. WHEELER, CHIEF ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,  
*Detroit, Mich., April 13, 1905.*

COLONEL: I have the honor to submit the following report upon the commerce using the Detroit River and also the St. Clair Flats Canal.

The compilation has been made from data similar to those used in 1902-3, viz, the marine post-office record of vessels passing through Detroit River, and the custom-house records of vessels stopping in Detroit.

The Detroit postmaster, Mr. F. B. Dickerson, has permitted the record of vessels passing Detroit River to be copied, while the record of those stopping was obtained from the collectors of customs at Detroit, Windsor, and Amherstburg. After the lists were completed the net registered tonnage was copied from the Canadian and American "Blue Books" and summed. The ferryboats plying between Detroit and





Windsor and Detroit and Belle Isle are not included. The results, by months, are as follows:

Month.	Number of vessels.	Net registered tonnage.
January.....	3	2,243
February.....	9	5,870
March.....	70	12,522
April.....	600	209,014
May.....	1,834	822,727
June.....	3,591	3,215,788
July.....	4,896	5,569,128
August.....	4,883	5,638,402
September.....	4,513	5,409,252
October.....	4,348	5,756,148
November.....	3,685	5,136,194
December.....	1,040	1,272,696
Total.....	29,472	33,049,984

The preceding results are compiled from official lists, which are required by law to be accurate and complete. The derived net registered tonnage is trustworthy and is probably not in error so much as 1 per cent. The actual freight carried can not be determined so accurately, because no record is kept in the Detroit River, but a close approximation can be obtained by comparison with the tonnage at St. Marys Falls Canal, where record of both net registered and actual freight are kept.

During the season of 1904 the actual freight passing St. Mary's Falls Canal was 0.294 per cent greater than the net registered tons. Assuming this ratio for the Detroit River, the actual freight would be 42,792,326 tons of 2,000 pounds each.

The commerce using the St. Clair Flats Canal is less than that of the Detroit River. It is found from the custom-house records that 3,683,578 net registered tons do not go through the canal but turn around and go back down the river. This should be subtracted from the Detroit River tonnage. There is a small amount of business done at Lake St. Clair ports which does not reach Detroit River, of which we have no actual record, but which is estimated by the custodian to aggregate 20,000 net registered tons during the season. This should be added to the Detroit River tonnage. Making the corrections, the commerce using St. Clair Flats Canal during the season of 1904 is found to be 29,383,406 net registered tons, or 38,044,929 actual freight tons.

The value of the freight passing St. Mary's Falls Canal during the season of 1904 was found to be \$10.60 per ton. Assuming this unit value for the Detroit River, then the total value of the actual freight passing the Detroit River during the season of 1904 would be \$453,598,656.

The commerce passing Detroit River has now been determined with accuracy for three consecutive years, as follows:

	Net registered tons.
1902.....	39,328,689
1903.....	37,453,796
1904.....	33,049,984
Total.....	109,832,469

This shows a decrease of about 2,000,000 tons in 1903 and about 4,000,000 tons in 1904. During the same year the net registered tonnage passing St. Mary's Falls Canal was:

	Not registered tons.
1902.....	31,955,582
1903.....	27,736,444
1904.....	24,364,138
Total.....	84,056,164

This shows about the same decrease. The total amount at St. Marys Falls Canal is 77 per cent of the Detroit River. It may be assumed that three-fourths of the commerce of the Detroit River goes through St. Marys Falls Canal; it may therefore be assumed that the decrease in both localities was due to the same cause. The com-

merce through the Detroit River is known accurately for only three years, while at St. Marys Falls Canal complete records have been kept for fifty years. For this reason a study has been made of the records of St. Marys Falls Canal for the purpose of finding, if possible, the cause of the large decrease in the commerce of the Detroit River.

The business through the St. Marys Falls Canal is shown graphically on the accompanying sketch. The double line shows the total freight tonnage. Iron ore, coal, cereals, and lumber are shown in their order. These four items are about 95 per cent of the total tonnage. Cereals include wheat, grain other than wheat, and flour.

Certain characteristic features are shown by the curves. For example, the total freight tonnage increased very uniformly from 1893 to 1901; in 1902 there was an abnormally large increase, at least 4,000,000 tons more than was indicated by the curve in 1901; in 1903 the total freight was about normal; in 1904 there was an abnormally large decrease, at least 4,000,000 tons less than was indicated by the curve of 1903.

An inspection of the iron-ore curve shows that its fluctuations were practically the same as those of the total freight; the cause is then to be looked for in the single commodity of iron ore.

The abnormal increase of iron ore in 1902 has no specific or single explanation. The demands for iron are from many different sources, and the total is in the nature of the summation of a harmonic series, and it is probable that many of the sources chanced to have their maximum about 1902. The decrease of 2,500,000 tons of iron ore in 1903 was not because 1903 was a small year, but because 1902 was a large year, and the decrease was a necessity in order to get back to the normal. The decrease of iron ore in 1904 of about 2,000,000 tons is abnormal, and is not so easily explained. One explanation is the strike of masters and pilots, which delayed shipments during the first part of 1904; this may perhaps prove to be sufficient.

The item of coal is shown by the sketch to have had a very uniform increase of about 230,000 tons per year up to 1902; in 1903 there was an abnormally large increase of about 2,000,000 tons. It is possible that this increase is due to the increased demands of iron furnaces in the vicinity of Lake Superior. It is therefore probable that the item of coal will continue to increase in the future.

The curve called cereals is made up of wheat, grain other than wheat, and flour. It appears to have passed its maximum in 1896, though 1902 was an abnormally large year. The decrease in this item is probably due to the fact that railroads are carrying more grain each year. It is not likely that this item will ever again be as large as it has been. The item of lumber shows a very regular curve, which apparently passed its maximum in 1901 or 1902. The decrease in lumber is probably due to the exhaustion of the supply.

The sketch shows graphically the importance of iron ore. It is the controlling factor of lake freights. From 1855 to 1894 it was about half of the total freight; in 1902 it was more than two-thirds. In view of the diminishing amounts of cereals and lumber the lake waterway is rapidly becoming simply a channel for the transfer of iron ore from the mines of Lake Superior to the furnaces of Pennsylvania.

Since a large part of the commerce of the Detroit River passes through the St. Marys Falls Canal, the conclusions reached for the latter are at least approximately applicable to the former.

Very respectfully, your obedient servant,

E. S. WHEELER,  
*Chief Assistant Engineer.*

Lieut. Col. CHAS. F. L. B. DAVIS,  
*Corps of Engineers.*

#### REPORT OF MR. CHAS. Y. DIXON, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,  
*Detroit, Mich., July 5, 1905.*

COLONEL: I have the honor to submit the following report of operations under my charge during the fiscal year ending June 30, 1905, connected with the improvement of the Detroit River:

*Section 2, Lime Kiln Crossing.*—The object of this improvement is to provide a clear depth of 21 feet (at a Lake Erie stage of 570.8 feet) throughout the west 300 feet of a 600-foot channel at Lime Kiln Crossing. The channel lines under this project are changed from those of former projects in order to straighten the channel, but taking advantage of former improvements. The material to be removed is mainly limestone

Sketch showing graphically freight tonnage passing through the Soo Canal from 1884-1904.







bed rock, all requiring to be drilled and blasted before being removed. The estimated cost of this improvement is \$430,625.

This work is being performed by G. H. Breymann & Bro., of Toledo, Ohio, under formal contract dated April 5, 1904, the contract prices being \$3.25 per cubic yard bank measurement, for all material above the 22-foot grade, and \$1.625 per cubic yard for all material removed between the 22 and 24 foot grades.

Work under this contract was commenced on July 29, 1904, continued until December 12, 1904, resumed on March 30, 1905, and continued to the end of the fiscal year. The plant used was as follows: Dredge *Tipperary Boy* (8 hours worked, 28 hours delayed); dredge *Brian Boru* (986 hours worked, 364 hours delayed); drill boat *Earthquake*, with four drills (2,853 hours worked); drill boat *Cyclone*, with two drills (3,473 hours worked); one derrick scow, with diving outfit (25 hours worked); two tugs, and the necessary dump scows.

There were removed from an area of about 23,000 square yards 13,003 cubic yards of full-rate material (above 22-foot grade), 17,578 cubic yards of half-rate material (between 22 and 24 foot grades), and 2,645 cubic yards of material for which no payment can be made (below 24-foot grade), subject to revision by future surveys, and the amount earned by the contractors was \$70,824.

Over an area of about 39,000 square yards the material was broken up by drilling and blasting. The holes were generally drilled at the corners of 5-foot squares, the number of holes drilled was 17,212, being 165,011 linear feet, and 170,669 pounds of dynamite were used.

*Section 4, Amherstburg reach and Hackett range.*—The object of this improvement is to provide a clear depth of 21 feet (at a Lake Erie stage of 570.8 feet) along Amherstburg reach and Hackett range for a maximum width of 600 feet and a minimum width of 300 feet, covering a length of channel of about 3 miles. The channel lines under this project are changed from those of former projects in order to straighten the channel, but taking advantage of former improvements. The material to be removed is limestone bed rock, loose stones and boulders, clay, and sand. The estimated cost of this improvement is \$804,000.

This work is being performed by M. Sullivan, of Detroit, Mich., under formal contract dated May 31, 1904, the contract prices being \$2.40 per cubic yard, bank measurement, for material above the 22-foot grade, and \$1.20 per cubic yard for material between the 22 and 24-foot grades.

Work under this contract was commenced on May 24, 1904, continued until December 12, 1904, resumed on March 21, 1905, and continued to the end of the fiscal year. The plant used was as follows: Dredges *Old Glory* (1,464 hours worked, 426 hours delayed); *Hercules* (1,756 hours worked, 649 hours delayed), *Gladiator* (765 hours worked, 358 hours delayed), and *Tipperary Boy* (1,403 hours worked, 773 hours delayed); drill boats No. 2 with three drills (4,584 hours worked), *Dynamiter* with three drills (4,427 hours worked), *Tornado* with two drills (3,650 hours worked), and *Cyclone* with two drills (198 hours worked); one derrick scow with diving outfit (339 hours worked), three tugs, and the necessary dump scows.

Over an area of about 120,000 square yards, the material was broken up by drilling and blasting. The number of holes drilled was 36,479 at the corners of 5-foot squares, being 260,313 linear feet, and the number of pounds of dynamite used was 328,444.

During the fiscal year there was removed from an area of about 225,000 square yards 78,260 cubic yards of full rate material (above 22-foot grade), 100,893 cubic yards of half-rate material (between 22 and 24 foot grades), and 43,482 cubic yards of material for which no payment can be made (below 24-foot grade), subject to revision by future surveys, and the amount earned by the contractor was \$308,895.60. The total amount earned under this contract to the end of the fiscal year was \$326,895.60.

*Bar Point shoals.*—Between September 27, 1904, and November 22, 1904, one dredge cut was made through Bar Point shoals at the mouth of the Detroit River for the purpose of determining the nature of the material in order that it might be accurately described in specifications for future improvement. This work was performed by the Muir-O'Sullivan Dredge and Dock Company, of Port Huron, Mich., under formal contract dated September 27, 1904, for furnishing and operating a dredging plant on the basis of "time work," the contract price being \$20 per hour of the actual working time.

The plant used consisted of one dredge, one tug, and the necessary dump scows, and was operated 269½ hours and delayed 309½ hours. There was removed 8,226 cubic yards, scow measurement, of sand, clay, small stones, and hardpan; and the amount earned by the contractors was \$5,390, being about 65½ cents per cubic yard.

Under date of March 2, 1905, a formal contract was entered into with G. H. Breymann & Bros., of Toledo, Ohio, for dredging at Bar Point shoals. The object of this improvement is to secure a clear depth of 21 feet (at a Lake Erie stage of 570.8 feet)

for a minimum width of 400 feet and a possible maximum width of 800 feet, covering a length of channel of about 5 miles. The material to be removed is sand, clay, silt, a few boulders, and some hardpan. The contract price for the performance of this work is 27 cents per cubic yard, scow measurement, and the total cost will be \$400,000.

Work under this contract was commenced on April 20, 1905, and continued to the end of the fiscal year. The plant used was as follows: Breymann's dredges No. 1 (380 hours worked, 283 hours delayed), and No. 2 (553 hours worked, 347 hours delayed), and Detroit Dredging Company's dredge No. 2 (517 hours worked, 264 hours delayed), three tugs, and the necessary dump scows.

There was removed from an area of about 216,000 square yards 251,674 cubic yards of sand, clay, silt, and small boulders; and the amount earned by the contractors was \$67,951.98.

*Plant operated by hired labor.*—During the fiscal year the plant operated by hired labor was employed as follows:

From July 1 to October 21, 1904, and from May 12 to June 30, 1905, the derrick scow with diving outfit belonging to the United States was engaged in removing boulders from the channel at various places between the head of Ballards reef and Bar Point. The object of this improvement was to secure a clear depth of 21 feet (at a Lake Erie stage of 570.8 feet) within areas not covered by existing contracts where this could be done without dredging. During the fiscal year there was removed 660 cubic yards of boulders from an area of about 275,000 square yards at a cost of \$7,150 being \$10.83 per cubic yard.

The areas improved by the derrick scow were examined by means of the sweeping raft from time to time. Also the channel from the north end of Fighting Island to Ballards reef was examined by the same means to determine what further work was necessary in order to secure the depth of water called for by the present project. This examination revealed the existence and location of a number of boulders (with a least depth of about 20 feet) which will be removed by the derrick scow.

During April and May, 1905, an examination was made by means of the sweeping raft of the channel from Ballards reef to Bar Point, and at various other times parts of this channel were so examined. This was done for the purpose of locating and removing obstructions to navigation.

During July, August, and September, 1904, an examination was made by means of the sweeping raft of the channel to the west of Grosse Isle to determine the practicability and cost of securing a 11-foot depth through to deep water in Lake Erie for a width of 300 feet with the view to the use of such channel by light-draft vessels. It was found that in order to secure a greater depth than 9 feet (at a Lake Erie stage of 570.8 feet) dredging would be necessary, and that in order to secure that depth a stretch of channel of about 4 miles would have to be improved by the removal of boulders overlying the bottom or partially embedded, at a cost of from \$15,000 to \$20,000.

During August, 1904, an examination was made by means of the sweeping raft to determine the width and location of a channel of 10½ feet clear depth (at a Lake Erie stage of 570.8 feet) from the main channel at Lime Kiln Crossing to Hickory and Sugar islands, thence to deep water in Lake Erie with the view to the use of such channel by excursion steamers.

During the latter part of June, 1905, an examination was made by means of the sweeping raft to determine the width and location of a channel of 6 feet clear depth (at a Lake Erie stage of 570.8 feet) from the main channel at Ballards reef to the east shore of Grosse Isle abreast of Stony Island, thence to Hickory and Sugar islands with the view to the use of such channel by local passenger steamers. This examination has revealed the existence and location of a number of boulders above the depth stated with a least depth of about 4½ feet (present depth 6.8 feet). Two spans and the intervening pier of the railroad bridge (not in use and condemned as unsafe for traffic) between Grosse Isle and Stony Island were removed by the Michigan Central Railroad Company during April and May, 1905, in order to open up this channel.

At various times, as the progress of the work has required, stakes have been driven in the water and ranges established on shore (where practicable) for the purpose of locating and controlling dredging operations under the several contracts.

All aids to navigation have been located by transit pointings from shore stations and their positions computed.

For use in connection with the operation of the derrick scow and sweeping raft, the tug *Quickstep* was hired from J. H. and D. Sullivan, of Detroit, Mich., from July 1 to November 17, 1904, under emergency contract dated April 15, 1904, at \$574 per calendar month; and the tug *S. J. Christian* was hired from G. G. and F. H. Hackett,

f Detroit, Mich., from April 24 to June 30, 1905, under emergency contract dated May 4, 1905, at \$609 per calendar month.

*Present condition of the channel.*—As a result of all improvements, depths being referred to a Lake Erie stage of 572.6 feet<sup>a</sup> above mean tide at New York, the present condition of the channel is as follows:

From Detroit to the south end of Fighting Island there is a clear depth of 22.8 feet or a width of 600 feet or more (300 feet or more each side of the sailing lines), thence to the north end of Lime Kiln Crossing there is a clear depth of 21 feet for the same width. The full width of channel is now in use.

Along the Lime Kiln Crossing range there is a clear depth of 19 feet for the east 120 feet and 21 feet for an additional 180 feet width to the westward, with a contract in force (work in progress) providing for the widening and deepening of the west half of the channel to 22.8 feet. The east 420 feet of channel is now in use and the western portion obstructed by improvements.

Along the Bois Blanc Island range there is a clear depth of 20 feet for a width of 600 feet. The full width of channel is now in use.

Along Amherstburg reach, for a length of 2,500 feet at the north end, within the west 250 feet, there is a clear depth of 22.1 feet, and within the east part (about 200 feet width) there is a clear depth of 19.5 feet; and for the remaining part of this course (about 4,500 feet) there is a clear depth of 22.1 feet for a width of 500 feet, with a contract in force (work in progress) providing for a widening to 600 feet and deepening to 22.8 feet. The east half of the central 500 feet is now in use and the west portion of the channel obstructed by improvements.

Along Hackett range to about 1½ miles south of Bois Blanc Island there is a clear depth of 19.3 feet for from 500 to 600 feet width, with a contract in force (work in progress) providing for a deepening to 22.8 feet for a width of 600 feet and length of 1,000 feet at the north end and for the west 300 feet throughout the southern portion. The east half of the channel is now in use and the west half obstructed by improvements.

From about 1½ miles south of Bois Blanc Island to about 1 mile south of Bar Point there is a clear depth of 21 feet for a width of 600 feet or more; thence to Detroit River light-house, through Bar Point shoals, there is a clear depth of 20 feet for a width of 800 feet (400 feet each side of a line joining Detroit River and Bois Blanc Island light-houses). The full width of channel is now in use.

Also, at Bar Point shoals there is a contract in force (work in progress) providing for a deepening to 22.8 feet for an additional 400 feet (or more) of width to the westward, extending from 14,000 feet north to 11,000 feet south from the Detroit River light.

*Surveys.*—During January and February, 1905, ice surveys were made at section 2, Lime Kiln Crossing, and at section 4, Amherstburg reach, and Hackett range, covering the areas improved during the season of 1904, for the purpose of computing the amounts of material removed; at Bar Point shoals for the purpose of computing estimates for future work; and at the dumping grounds, where material was deposited during the season of 1904, for the purpose of determining their condition. These surveys consisted in the taking of soundings at 10-foot intervals along cross sections 10 feet apart, except at Bar Point shoals, where the soundings were taken at 10-foot intervals along cross sections 20 feet apart. The number of soundings taken was 91,720, at a cost of \$1,620, being 1.8 cents per sounding.

*Water-gauge readings.*—On August 4, 1904, two temporary automatic water gauges were installed (in addition to the permanent gauge) for the purpose of obtaining data to determine the slope in the river. These gauges were all located near the Canadian shore—the permanent gauge (No. 1) being nearly abreast of the south end of Bois Blanc Island, a temporary gauge (No. 2) about 9,800 feet north of No. 1 at Lime Kiln Crossing, and a temporary gauge (No. 3) about 5,350 feet north of No. 2 at Ballard reef. These gauges were connected by a line of levels and referred to permanent bench marks on shore and all kept in operation until November 30, 1904. The records from these gauges give the following results:

	Feet.
Mean slope from gauge No. 1 to gauge No. 2.....	0.45
Mean slope from gauge No. 2 to gauge No. 3.....	.44
Mean slope from gauge No. 1 to gauge No. 3.....	.89
Maximum slope from gauge No. 1 to gauge No. 3 <sup>b</sup> .....	1.81
Minimum slope from gauge No. 1 to gauge No. 3 <sup>c</sup> .....	.35

<sup>a</sup> Grade to which former improvements were referred.

<sup>b</sup> At a Lake Erie stage of 571.57.

<sup>c</sup> At a Lake Erie stage of 574.42.

The permanent automatic water gauge at the mouth of the Detroit River was attended to regularly during the year, and the record derived therefrom has been reduced. The following are the elevations (levels of 1903) above mean tide at New York of the mean stage for the several months:

July, 1904.....	573.68	January, 1905.....	571.74
August, 1904.....	573.38	February, 1905.....	571.46
September, 1904.....	573.10	March, 1905.....	571.55
October, 1904.....	572.70	April, 1905.....	572.04
November, 1904.....	572.20	May, 1905.....	572.78
December, 1904.....	572.06	June, 1905.....	573.22

The highest stage of water during the year was 574.52, on July 23, 1904, and the lowest stage was 569.78, on December 20, 1904, the extreme yearly fluctuation being 4.74 feet. The month of greatest fluctuation was December, 1904 (3.95 feet), and the month of least fluctuation was July, 1904 (1.53 feet). The greatest fluctuations during a period of twenty-four hours were as follows: 2.88 feet on August 20, 1904; 2.35 feet on November 29, 1904; 2.68 feet on December 20, 1904, and 2.34 feet on June 6, 1905.

Very respectfully, your obedient servant,

CHAS. Y. DIXON,  
*Assistant Engineer.*

Lieut. Col. CHAS. E. L. B. DAVIS,  
*Corps of Engineers.*

## O O 8.

### REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

*Wreck of steamer Minnesota.*—This vessel was burned and sunk November 17, 1903, in about 40 feet of water, 2,000 feet below Grande Pointe Hotel in the St. Clair River, and being on the Canadian side of the river the Dominion government removed it. The removal was completed in November, and an examination of the site made by the United States steamer *Hancock* on November 15 showed a clear depth of 24 feet over the wreck. The allotment of \$6,000 for this work was therefore returned to the Treasury.

*Wreck of steamer Germanic.*—This steamer was burned and sunk November 6, 1904, near the head of Stag Island. The wreck was not in the channel and was removed by her owners.

*Wreck of steamer City of Berlin.*—This steamer was sunk on August 7, 1904, in collision near Belle Isle, on the Canadian side. She was so far out of the channel as to be no serious obstruction to navigation. She was raised and removed by her owners.

*Wreck of the barge Richard Martini.*—This barge was sunk on April 24, 1905, about 1,400 feet above Belle Isle Bridge. A contract was made May 8, 1905, for the removal of the wreck for \$1,200.

*Wrecks of steamers Linden and City of Rome.*—These two vessels collided and sank in the St. Clair River channel, near Tashmoo Park, on June 23, 1905. The owners of the *City of Rome* have made a contract for raising that vessel, and it is understood that similar action will be taken by the owners or underwriters of the *Linden*.



## O O 9.

## SURVEY OF WATERS CONNECTING LAKES SUPERIOR AND HURON.

[Printed in House Document No. 215, Fifty-eighth Congress, third session.]

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
*Washington, January 7, 1905.*

SIR: I have the honor to transmit herewith for presentation to Congress final report, dated December 3, 1904, by Lieut. Col. C. E. L. B. Davis, Corps of Engineers, on the survey of the connecting waters between Lake Superior and Lake Huron, including Hay Lake channel, with plan and estimate of the cost of such improvement as will secure a safe and convenient channel 21 feet deep between said lakes.

This survey was ordered by the river and harbor act of March 3, 1899, and under date of June 4, 1900, a preliminary report was submitted by Col. G. J. Lydecker, Corps of Engineers, which report is printed as House Document No. 128, Fifty-sixth Congress, second session. One of the plans presented in Colonel Lydecker's report was adopted by the river and harbor act of June 13, 1902, this plan being to provide a channel of the required depth 1,000 feet wide, from the canal to deep water in Hay Lake, and to make a new outlet from Hay Lake to Mud Lake, through the West Neebish, at least 300 feet wide and 21 feet deep, and to deepen the old channel from Hay Lake to Mud Lake, through the Middle Neebish, to the requisite depth, leaving the width unchanged. The cost of this project was estimated by Colonel Lydecker at \$5,750,000, and an appropriation therefor in the amount of \$500,000, with authority to expend \$4,000,000 additional under continuing contract, was made in the latter act mentioned.

Lieutenant-Colonel Davis states that the full amount of Colonel Lydecker's estimate will be needed to finish this work, the greater part of which is already under contract and well under way.

To provide for a connecting channel from Lake Superior through the canal to the upper terminus of the portion just described, Colonel Lydecker proposed to construct a new lock on the site of the old Weitzel lock and to deepen and widen the canal above the lock. Lieutenant-Colonel Davis estimates the cost of this work at \$4,410,000 in addition to sums now in hand, leaving \$5,660,000 in excess of the existing authorization still to be provided to complete the improvement. He recommends that, in order to avoid confusion and complication, the money be appropriated under the title of "Improving St. Marys River, Michigan."

By reference to the map<sup>a</sup> submitted with Lieutenant-Colonel Davis's report it will be seen that he proposes to place the lock nearly on the site of the Weitzel lock, but not exactly so. This is done in order to make it as easy as possible for large vessels to enter and leave the lock without being forced to change direction at any angle of the entrance cribs. He proposes a lock about 70 feet wide and about 1,300 feet long, in order that two or possibly three large vessels may be locked through at once, one lying astern of the other. He prefers this form to a wider lock in which vessels might be arranged side by side, since

<sup>a</sup> Not reprinted; printed in House Document No. 215, Fifty-eighth Congress, third session.

much time is lost in moving vessels into such position after entering the lock.

These facts are brought out in a subsequent letter<sup>a</sup> from Lieutenant-Colonel Davis, explaining the reasons for the position and form of the lock chosen.

The general form of lock presented by Lieutenant-Colonel Davis has been favorably considered by three officers who have recently had charge of this improvement, but the position of the lock is, in my opinion, a matter requiring still further study.

I concur in the views expressed by Colonel Lydecker and Lieutenant-Colonel Davis that it is necessary to construct another lock in order to provide the channel called for by Congress, and recommend the adoption of the plan suggested by Lieutenant-Colonel Davis, reserving, however, definite decision as to the location and precise dimensions of the lock for further consideration.

Very respectfully,

A. MACKENZIE,  
*Brig. Gen., Chief of Engineers, U. S. Army.*

Hon. WM. H. TAFT,  
*Secretary of War.*

FINAL REPORT ON SURVEY OF WATERS CONNECTING LAKES SUPERIOR  
AND HURON, INCLUDING HAY LAKE CHANNEL, ST. MARYS RIVER, WITH  
A VIEW TO SECURING A CHANNEL 21 FEET DEEP.

UNITED STATES ENGINEER OFFICE,  
*Detroit, Mich., December 3, 1904.*

**GENERAL:** I have the honor to submit the following final report upon the survey, plan, and estimate of cost for securing a channel 21 feet deep through St. Marys River, Michigan.

The river and harbor act of March 3, 1899, contained the following clause:

Improving Hay Lake Channel, St. Marys River: \* \* \* *Provided further,* That the Secretary of War shall cause to be made and reported as early as practicable, a survey of the connecting waters between Lakes Superior and Huron, including Hay Lake Channel, with a plan and estimate of the cost of such improvement as will secure a safe and convenient channel twenty-one feet deep between said lakes, the expense of which shall be paid from the said appropriation for improving Hay Lake Channel.

Up to the time of the passage of this act the project for the improvement of St. Marys River provided for a channel 20 feet deep and 300 feet wide through all the shoals between the canal and Mud Lake, through the Middle Neebish, and Little Mud Lake.

To secure a safe and convenient channel 21 feet deep between Lakes Superior and Huron, as called for by the act, Col. G. J. Lydecker, Corps of Engineers, submitted a preliminary report dated June 4, 1900, printed in House Document No. 128, Fifty-sixth Congress, second session, and published in Annual Report of the Chief of Engineers for 1901.

Two plans were proposed. The first was to provide a channel, of the required depth, 1,000 feet wide from the canal to the upper entrance

<sup>a</sup> Not printed.

to Hay Lake, and to widen the various cuts through Little Rapids, Hay Lake, Middle Neebish, and Mud Lake, so as to secure a least width of 600 feet.

The second plan was the same as the first as far as deep water in Hay Lake, from which point it was proposed to provide a new outlet from Hay Lake to Mud Lake through the West Neebish at least 300 feet wide and of the required depth of 21 feet, the old channel between Hay and Mud lakes through the Middle Neebish to be deepened to 21 feet, but the width of channel to remain unchanged. The estimated cost of this second project was, in round numbers, \$5,750,000.

Congress by act of June 13, 1902, adopted this second project with a proviso that the Secretary of War might contract for such materials and work as might be required to prosecute the project, not to exceed in the aggregate \$4,000,000, exclusive of the amount of \$500,000 therein appropriated, making \$4,500,000 available.

Contracts to the amount of nearly \$4,000,000 have been made for a 21-foot channel from the foot of the canal to Mud Lake through the West Neebish, including the removal of several small shoals in Mud Lake. The work is well under way and the authorized amount, \$4,500,000, will be sufficient to complete this portion of the through channel.

Work on the Middle Neebish channel is still unprovided for and the balance of Colonel Lydecker's estimate of June 4, 1900, \$1,250,000, will be needed for the dredging required to obtain the increased depth called for.

The project for the improvement of St. Marys River, approved by the Secretary of War October 27, 1902, contained an estimate of \$1,050,000 for widening the canal. Of the unexpended balance of \$760,000 remaining on hand, \$30,000 was allotted in the same project for constructing the cofferdam for widening the canal, and up to date about one-half of this amount has been so expended, leaving \$1,020,000 yet to be appropriated for this widening.

The purchase of land fronting on the river extending from the Weitzel lock to the old Fort Brady Reservation is still going on, \$148,810 having already been expended. The cost of five lots, of which the titles, at the writing of this report, are in the hands of the Department of Justice, will be \$122,600. All of the remaining lots west of River street, with the exception of two, have been offered for sale and appraised at \$71,000. The two referred to will probably have to be condemned, the valuation being problematical, but somewhere between \$14,000 and \$23,000.

An additional allotment of \$90,000 will be needed to complete the purchase of these lands.

The depth of water on the lower miter sill of the Poe lock varies from a minimum of 18.7 feet to a maximum of 20 feet, the average being about 19.2. It will therefore be seen that in order to secure a safe and convenient channel of 21 feet between the two lakes the depth over the lower miter sill should be 21 feet at low-water stage, which will give a maximum of about 23.4, or enough at all stages to accommodate vessels navigating the 21-foot channel.

To meet these conditions Colonel Lydecker, in his preliminary report, stated that a project had been studied looking to the rebuilding of the Weitzel lock, the cost of which he estimated in round numbers would be \$3,000,000.



Careful estimates made since for a lock situated on the site of the Weitzel lock, as recommended by Colonel Lydecker, give in round numbers the cost of the lock and approaches \$3,300,000.

The following is the final estimate of the cost of the project complete:

21-foot channel, West Neebish route.....	\$4,500,000
21-foot channel, Middle Neebish route .....	1,250,000
Widening of canal upper entrance .....	1,020,000
Purchase of additional land .....	90,000
New lock .....	3,300,000
Total. ....	10,160,000

of which \$4,500,000 has been appropriated, leaving a balance of \$5,660,000 yet to be provided.

In order to avoid the complication arising from differently worded appropriations and the confusion naturally arising therefrom, it is recommended that a lump sum be appropriated under the title of "Improving St. Marys River, Michigan," thus leaving the allotments to be expended for the various details of the improvements to be determined by the officer in charge, subject to the approval of higher authority.

Two tracings are sent in separate roll, one a sketch showing the improvements already provided for in the St. Marys River and also the portions yet to be improved to obtain the 21 feet depth required, the other a sketch showing the proposed location of the new lock on the site of the Weitzel lock, this location, however, being provisional for the present, the exact site to be determined after further study.

Very respectfully, your obedient servant,

CHAS. E. L. B. DAVIS,

*Lieut. Col., Corps of Engineers, U. S. Army.*

Brig. Gen. A. MACKENZIE,

*Chief of Engineers, U. S. A.*

O O 10.

#### SURVEY OF DETROIT RIVER, MICHIGAN.

[Printed in House Document No. 40, Fifty-eighth Congress, third session.]

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
*Washington, December 2, 1904.*

SIR: I have the honor to submit herewith, for transmission to Congress, report of Lieut. Col. Chas. E. L. B. Davis, Corps of Engineers, dated November 22, 1904, with a map<sup>a</sup> giving results of the survey ordered by the river and harbor act of March 3, 1899, of the Detroit River, from Detroit to Lake Erie, with a plan and estimate of the cost of a safe and convenient channel, 21 feet deep, between these points.

Under date of June 5, 1900, the Secretary of War transmitted to Congress a preliminary report by Lieut. Col. G. J. Lydecker, Corps of Engineers, upon the progress of this survey. This report was printed

<sup>a</sup> Not reprinted; printed in House Document No. 40, Fifty-eighth Congress, third session.

as House Document No. 712, Fifty-sixth Congress, first session. In it Colonel Lydecker outlined three possible routes for the proposed improvement, and Congress, in the river and harbor act of June 13, 1902, adopted one of these routes, appropriating and authorizing the sum of \$1,750,000 toward carrying on the work. Contracts have been made covering about \$1,400,000 for carrying on the work under this plan.

The estimate submitted by Colonel Lydecker in his preliminary report was necessarily only approximate, and was based upon a channel 21 feet deep below the mean level of Lake Erie. Owing to the constant fall in the level of the lake, which has been noted for the last twenty years, it has seemed necessary, in order to comply with the act of Congress, to measure this depth below the low-water plane rather than below the mean level. Accordingly, in his final report, Lieutenant-Colonel Davis submits estimates for a channel 21 feet deep, measured below the mean monthly plane of November, 1895, this being the lowest mean monthly stage recorded during the season of navigation, and being 1.1 feet lower than that assumed by Colonel Lydecker in his preliminary report. The cost is greatly increased by thus adding to the depth of excavation, and is estimated, in round numbers, at \$3,750,000, leaving a total of \$2,000,000 to be furnished to complete the work in excess of the sums already appropriated and authorized.

Very respectfully,

A. MACKENZIE,  
*Brig. Gen., Chief of Engineers, U. S. Army.*

Hon. WM. H. TAFT,  
*Secretary of War.*

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FINAL REPORT ON SURVEY OF DETROIT RIVER, MICHIGAN, FROM  
DETROIT TO LAKE ERIE.

WAR DEPARTMENT,  
UNITED STATES ENGINEER OFFICE,  
*Detroit, Mich., November 22, 1904.*

GENERAL: I have the honor to submit the final report, with plan and estimate, for securing a channel 21 feet deep in the Detroit River from Detroit to Lake Erie.

The river and harbor act of March 3, 1899, appropriated \$100,000 for continuing the improvement of the Detroit River with the proviso:

That the Secretary of War shall cause to be made and reported as early as practicable a survey of the Detroit River from Detroit to Lake Erie, with a plan and estimate of the cost of such improvement as will secure a safe and convenient channel twenty-one feet deep between said points.

In accordance with this proviso the officer then in charge of this district, Lieut. Col. G. J. Lydecker, Corps of Engineers, submitted a preliminary report, dated May 29, 1900, published in House Document No. 712, Fifty-sixth Congress, first session, and in the Annual Report of the Chief of Engineers for 1900, page 4016, Appendix O O.

In this report Colonel Lydecker submitted three plans, designated as A, B, and C, with roughly approximate estimates of cost. Plan A

was to continue operations in the channel then under improvement, plan B to construct an entirely new channel to the westward of Bois Blanc Island, and plan C to excavate a new channel entirely in American waters. He reported that plans A and B, or a combination of them, were the only ones calling for serious consideration, but that neither time nor data at that time available permitted a conclusive discussion of the subject, and it was proposed to make further surveys in relation to these two plans, and to submit full and final report with detailed plans and estimates.

He stated that approximate estimates of the amount of excavation indicated that the cost of plan A would be from \$1,750,000 to \$2,000,000.

The river and harbor act of June 13, 1902, contained the following clause:

Improving Detroit River, from Detroit to Lake Erie, in accordance with the report submitted in House Document Numbered Seven hundred and twelve, Fifty-sixth Congress, first session, and designated as "Plan A," five hundred thousand dollars. \* \* \* *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one million two hundred and fifty thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Congress has therefore eliminated plan C, or any combination of plans A and B, and adopted plan A simply, so the following report will be confined to plan A, as outlined in Colonel Lydecker's preliminary report.

This plan is to continue operations in the channel under improvement so as to complete it with a low-water depth of 21 feet and a minimum width of 600 feet, the side lines of excavation to be so located as to make the channels as straight as possible, and especially to eliminate the dangerous bends existing between the head of Limekiln Crossing and Bois Blanc Island. On the plan accompanying the preliminary report and forming part of it, the channel width is increased from 600 to 800 feet opposite Bar Point, and is continued at that width out into Lake Erie.

Maj. William H. Bixby, Corps of Engineers, under date of September 24, 1902, recommended that a final report be submitted, and discussed the subject of a plane of reference at some length. He recommended that, as the surface of Lake Erie had been gradually dropping for nearly twenty years and at the time of his report was at least 2 feet lower than in 1882, the 21 feet of channel depth be measured below the Lake Erie grade of 570.8 feet. This recommendation was embodied in Major Bixby's project for improving the Detroit River, dated October 8, 1902, and was approved by the Secretary of War October 25, 1902.

The soundings have all been reduced to this datum plane, viz, 570.8 feet above mean tide in New York Harbor, this being the lowest mean monthly stage during the season of navigation of which there is record, that of November, 1895.

The project as approved required the removal of the Detroit River light-house, and under date of September 21, 1904, I recommended that a change be made in the direction of the improved channel between Bar Point and deep water in Lake Erie, the new channel being shifted about 600 feet to the westward, thus clearing the light-house and avoiding the necessity for its removal. This recommendation was approved by the Secretary of War November 12, 1904.

There is transmitted in separate roll a tracing showing the channel lines as adopted under the final approved project, the areas covered by existing contracts being shown by dotted lines and the areas yet to be deepened to obtain the required depth of 21 feet by full lines.

The surveys consisted in taking soundings, nearly all through the ice, over the entire area at regular intervals. For all areas, except Bar Point shoals, the river bottom is more or less uneven and the soundings were taken at the corners of 10-foot squares. For Bar Point shoals, north of the Detroit River light-house a distance of 19,000 feet where the bottom is quite uniform, the soundings were taken at 10-foot intervals along cross sections 20 feet apart at right angles to the channel line, and for Bar Point shoals, south of the Detroit River light-house for a distance of 10,000 feet, the soundings were taken at 10-foot intervals on cross sections 40 feet apart. The total number of soundings taken within the area covered by the estimate was about 290,000.

The following is the estimate of the cost:

*Approximate cost of work yet to be put under contract.*

Item A, 43,600 cubic yards, at \$4.25 .....	\$185,300	
Ballards reef, 332,000 cubic yards, at \$2.125 .....	705,500	
		\$890,800
Item B, 60,250 cubic yards, at \$4 .....	241,000	
Limekiln Crossing, 71,000 cubic yards, at \$2.....	142,000	
		383,000
Item C, 234,500 cubic yards, at 30 cents.....	70,350	
North end Bois Blanc Island, 86,000 cubic yards, at 15 cents ...	12,900	
		83,250
Item D, 100,700 cubic yards, at 75 cents .....	75,525	
Hackett range, 137,400 cubic yards, at 37½ cents.....	51,525	
		127,050
Item E, 1,400,000 cubic yards, at 35 cents.....	490,000	
Bar Point shoals, 800,000 cubic yards, at 17½ cents.....	140,000	
		630,000
Total.....		2,114,100
Plus 10 per cent for engineering and contingent expenses .....		211,410
Total .....		2,325,510
Amount authorized by river and harbor act of June 13, 1902 .....		1,750,000
Amount under contract and expended .....		1,400,000
Balance available for further work .....		350,000
Cost of work yet to be put under contract.....		2,325,510
Amount yet to be appropriated to complete project.....		1,975,510

It will be seen that the final estimate exceeds the original approximate estimate by nearly \$2,000,000. In explanation, it is to be borne in mind that the grade has been lowered 1.8 feet below that of previous projects and 1.1 feet below that used in the preliminary estimates. This lowering renders it necessary to deepen nearly the entire channel, when it was expected that a large part of this area could be omitted from future contracts for improvement. The survey also revealed that a larger percentage of bed rock must be removed at Ballards reef than was expected, thus increasing the unit price from \$4 to \$4.25 per cubic yard.

The following table shows the excess of the present estimate over that of 1902:

Item.	Present estimate.	Excess.
A .....	\$890,800	\$810,800
B.....	383,000	270,500
C.....	83,250	10,500
D.....	127,050	25,000
E.....	630,000	132,750
Section 2, now under contract.....		181,625
Section 4, now under contract.....		364,745
Plus 10 per cent for contingencies .....		1,795,920
Excess yet to be appropriated .....		1,975,510
Or, in round numbers .....		2,000,000

Very respectfully, your obedient servant,  
CHAS. E. L. B. DAVIS,  
*Lieut. Col., Corps of Engineers.*  
Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

O O II

MODIFICATION OF HARBOR LINES IN DETROIT RIVER AT MOUTH OF ROUGE RIVER, MICHIGAN.

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
*Washington, June 1, 1905.*

SIR: 1. When the matter of determining the harbor line on the west shore of Detroit River in the vicinity of the city of Detroit was under consideration with a view to its establishment by the Secretary of War, the chart was so drawn and the description so worded as to show a continuous line at the point where the River Rouge debouches into the Detroit. This line was approved by the Acting Secretary of War September 23, 1892.

2. Inasmuch as a duly established harbor line indicates the limit, on the one hand, of the area of navigable waterway under the jurisdiction of the United States, and on the other hand the water area relegated to the control of the riparian owners, it might be inferred that in this case jurisdiction and control had been relinquished by the United States over the entire navigable channel of the Rouge River. It is confidently believed that this was not intended, and that the harbor line at this point was so drawn and described as a matter of convenience for reference, and without regard to any bearing it might have on the status of Rouge River.

3. Rouge River is a navigable waterway of the United States, and as such it is important that it should be free from any doubt or question as to the applicability thereto of the laws relating to navigable waters.

4. With a view, therefore, of removing any trace of uncertainty as to the effect in this respect of the harbor line established in this case, I recommend that the existing harbor line on the west shore of Detroit

River be modified so as to leave an opening 285 feet wide at the mouth of the Rouge River.

5. I further recommend that the modification, if approved, be shown on the original harbor line chart.

6. In anticipation of the Secretary's approval of these recommendations, the accompanying chart has been modified as proposed and prepared for his signature.

Very respectfully,

A. MACKENZIE,

*Brig. Gen., Chief of Engineers, U. S. Army.*

Hon. W. H. TAFT,

*Secretary of War.*

[First indorsement.]

WAR DEPARTMENT, *June 3, 1905.*

Approved as within recommended.

ROBERT SHAW OLIVER,

*Assistant Secretary of War.*



## APPENDIX P P.

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### IMPROVEMENT OF RIVERS AND HARBORS ON LAKE ERIE, IN THE STATE OF OHIO.

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**REPORT OF LIEUT. COL. DAN C. KINGMAN, CORPS OF ENGINEERS,  
OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30,  
1905, WITH OTHER DOCUMENTS RELATING TO THE WORKS.**

#### IMPROVEMENTS.

- |                                       |  |
|---------------------------------------|--|
| 1. Toledo Harbor, Ohio.               | 7. Cleveland Harbor, Ohio.               |
| 2. Port Clinton Harbor, Ohio          | 8. Fairport Harbor, Ohio.                |
| 3. Sandusky Harbor, Ohio.             | 9. Ashtabula Harbor, Ohio.               |
| 4. Huron Harbor, Ohio.                | 10. Conneaut Harbor, Ohio.               |
| 5. Vermilion Harbor, Ohio.            | 11. Removing sunken vessels or craft ob- |
| 6. Black River Harbor (Lorain), Ohio. | structing or endangering navigation.     |
- 

ENGINEER OFFICE, UNITED STATES ARMY,  
*Cleveland, Ohio, July 19, 1905.*

GENERAL: I have the honor to forward herewith annual reports for  
work in my charge for fiscal year ending June 30, 1905.

Very respectfully, your obedient servant,

DAN C. KINGMAN,  
*Lieut. Col., Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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#### P P I.

#### IMPROVEMENT OF TOLEDO HARBOR, OHIO.

For an account of early history and projects of improvements see  
pages 2614 to 2616, Report of Chief of Engineers, 1898, and for  
latest projects see pages 3020 and 3021, Report of Chief of Engi-  
neers, 1899.

For a statement and estimate of cost of the project of 1899 and  
maps showing the limits of "divisions" into which the work is sepa-  
rated see Report of Chief of Engineers, 1898, pages 2693 to 2705.  
An accurate map of the harbor of Toledo was published in the Report  
of Chief of Engineers, 1901.

The work of excavating the straight channel under the continuous  
contract with the Lydon & Drews Company was in progress at the  
beginning of the year, and it was continued throughout the period.  
Three good dredges were employed upon the work and they removed  
1,292,849 cubic yards of material, scow measurement. They have  
now completed all the work except the outer portion of the straight  
channel. While the progress has been good it has not been such as  
to indicate that the work will be completed within the contract time.



A few months' extension may be necessary. This delay has caused no inconvenience to commerce and will involve no increased cost to the United States except the cost of inspection during the period of extension.

The U. S. dredge *Maumee* was used elsewhere during the greater portion of the season of 1904. In the spring of 1905 it was returned to the work and the total amount excavated during the year was 43,740 cubic yards, making a total done by this machine of 881,891 cubic yards. This work has been in the river at a number of scattered localities and has been the most extensive and difficult work connected with the improvement, and for this reason has been assigned to the Government dredge. The dredge and tug are in good condition, but the scows are about worn-out. Additional scows will have to be provided to maintain the plant in a state of working efficiency.

No detailed examination of the channel has been practicable as yet this season, but vessels drawing 19 feet are passing in and out without any difficulty.

The following is a statement of expenditures made on account of improving harbor at Toledo, Ohio, during the fiscal year 1905:

General administration:

Office and engineering.....	\$1,657.50	
Travel and miscellaneous .....	359.95	
Repair and maintenance of storehouse....	212.97	
Purchase and repair of plant .....	168.18	
		<hr/> \$2,398.75

Dredge fleet (*Maumee*, *Spear*, and scows):

Services .....	4,794.44	
Supplies .....	1,433.61	
Repairs.....	2,540.16	
Subsistence .....	467.56	
		<hr/> 9,285.77

Steamer *Visitor*:

Services .....	4,284.91	
Supplies .....	731.21	
Subsistence .....	645.23	
Repairs.....	212.83	
		<hr/> 5,874.18

Dredging (the Lydon & Drews Company):

Paid to contractor.....	106,055.41	
Inspection .....	4,052.18	
		<hr/> 110,107.59

Total expended .....		127,614.29
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For a detailed account of the work done, and for the use made of the plant belonging to the harbor of Toledo during the past year, attention is respectfully invited to the report of Assistant Engineer William T. Blunt, which is transmitted herewith. He has also submitted in his report the results of triangulation of Maumee River and Bay. This special work he has done from time to time as opportunity afforded during a number of years. The results are of more than local interest and are valuable both geographically and hydrographically, and it is respectfully recommended that they be printed in the report.

An appropriation of \$60,000 is recommended for this harbor, of which \$15,500 is the balance of the authorization of 1899 and will be used to complete the project, and \$44,500 which will be used for the purpose of maintaining the required depths in the channel in Maumee River and Bay and for the repair and improvement of plant used in this connection.

Money statement.

July 1, 1904, balance unexpended .....	\$260, 172. 46
Amount appropriated by river and harbor act approved March 3, 1905. ....	20, 000. 00
Amount appropriated by sundry civil act approved March 3, 1905.....	161, 000. 00
Proceeds from sale of Government property.....	176. 00
	<hr/>
	441, 348. 46
June 30, 1905, amount expended during fiscal year, for works of improve- ment .....	127, 616. 14
	<hr/>
July 1, 1905, balance unexpended .....	313, 732. 32
July 1, 1905, outstanding liabilities .....	19, 353. 80
	<hr/>
July 1, 1905, balance available .....	294, 378. 52
	<hr/>
July 1, 1905, amount covered by uncompleted contracts .....	210, 346. 83
	<hr/>
Amount (estimated) required for completion of existing project .....	15, 000. 00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement.....	\$15, 000. 00
For maintenance of improvement.....	45, 000. 00
	<hr/>
	60, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

AMOUNT AND DATE OF ALL APPROPRIATIONS.

Old channel.

June 23, 1866.....	\$20, 000. 00	March 3, 1879 .....	\$20, 000. 00
March 2, 1867 .....	20, 000. 00	June 14, 1880.....	30, 000. 00
April 10, 1869 .....	29, 700. 00	March 3, 1881 .....	40, 000. 00
July 11, 1870.....	50, 000. 00	August 2, 1882 .....	50, 000. 00
March 3, 1871 .....	50, 000. 00	July 5, 1884.....	20, 000. 00
June 10, 1872.....	15, 000. 00	August 5, 1886 (see note) ...	9, 632. 61
March 3, 1873 .....	100, 000. 00	August 11, 1888 .....	5, 000. 00
June 23, 1874.....	75, 000. 00	September 19, 1890 .....	5, 000. 00
March 3, 1875 .....	75, 000. 00		<hr/>
August 14, 1876 .....	60, 000. 00	Total for old channel .	724, 332. 61
June 18, 1878.....	50, 000. 00		

Straight channel.

July 5, 1884 .....	\$25, 000. 00	April 28, 1904 .....	\$70, 000. 00
Deduct amount appropriated for old channel (see note). ....	9, 632. 61	May 10, 1904 (proceeds of sale of Government prop- erty) .....	16. 00
	<hr/>	February 11, 1905 (proceeds of sale of Government property) .....	176. 00
August 5, 1886 .....	112, 500. 00	March 3, 1905 .....	20, 000. 00
August 11, 1888 .....	150, 000. 00	March 3, 1905 .....	161, 000. 00
September 19, 1890 .....	200, 000. 00		<hr/>
July 13, 1892.....	200, 000. 00	Total for straight channel.....	1, 867, 689. 14
August 18, 1894 .....	70, 000. 00		<hr/>
June 3, 1896.....	150, 000. 00	Total of all appropri- ations for Toledo Harbor, Ohio.....	2, 592, 021. 75
March 3, 1899 .....	150, 000. 00	Expended to June 30, 1905.	2, 278, 289. 43
June 6, 1900.....	132, 500. 00		<hr/>
March 3, 1901 .....	8, 000. 00	Unexpended July 1, 1905 .....	313, 732. 32
June 13, 1902.....	15, 000. 00		
June 28, 1902.....	223, 000. 00		
November 29, 1902 (proceeds of sale of Government prop- erty) .....	129. 75		
March 3, 1903 .....	190, 000. 00		

NOTE.—By act of August 5, 1886, the balance then available of the \$25,000 appropriated July 5, 1884, for straight channel was made available for clearing the old channel.

2302 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

CONTRACT IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

*Contract for dredging in straight channel through Maumee River and Bay, and for constructing a dike between turn-out channels, Toledo Harbor, Ohio.*

Name of contractor: The Lydon & Drews Company, Chicago, Ill.  
Date of contract: July 21, 1899.  
Date of approval: September 23, 1899.  
Date of commencement: May 1, 1900.  
Date of completion: September 30, 1906.

COMMERCIAL STATISTICS.

The following statistics for the year 1904 relative to the commerce of the harbor of Toledo, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Coal .....	45, 349	Coal .....	2, 105, 644
Fish .....	803	Corn.....	5, 482
Flax .....	24, 510	Flour.....	10, 720
Iron, manufactured .....	1, 110	Merchandise .....	24, 730
Iron ore.....	514, 197	Timber.....	21, 041
Lath .....	3, 339	Wheat.....	14, 940
Lumber.....	65, 047		
Merchandise.....	35, 274		
Salt .....	14, 144		
Sand .....	206, 858		
Shingles .....	17		
Ties.....	6, 327		
Wheat .....	15, 587		
Total .....	932, 512	Total .....	2, 182, 507

Total freight tonnnge:	
1904 .....	3, 115, 019
1903 .....	3, 632, 514
Decrease.....	517, 495

Vessels.	Number.	Tonnage.
Entering.....	1, 567	1, 097, 795
Departing.....	1, 591	1, 103, 386
Built.....	4	1, 460

Total registered tonnage (vessels entering and departing):	
1904 .....	2, 201, 181
1903 .....	2, 864, 087
Decrease.....	662, 906

Draft of largest vessels using harbor, 20 feet.  
Largest vessels do not load to full depth.  
No new vessel lines established during the year.

REPORT OF MR. WILLIAM T. BLUNT, ASSISTANT ENGINEER.

TOLEDO, OHIO, July 1, 1905.

COLONEL: I have the honor to submit the following report upon Toledo Harbor, Ohio, for fiscal year ending June 30, 1905.  
All depths mentioned are given at mean level of Lake Erie 1860-1875, the lake surface being now about 0.3 foot above that level.

STRAIGHT CHANNEL THROUGH MAUMEE RIVER AND BAY.

*Contract, The Lydon & Drews Company.*—Three dredges continued work until November 30, 1904, and had then completed the widening of middle division on both sides, and extended it past the cribs about 4,000 feet into the outer division. Work was resumed by dredge No. 1 April 19, 1905, by No. 8 on April 26, and by *Starke No. 5* on May 23, all in outer division. The extreme outer end of the channel is to be completed during the summer, leaving the less exposed portion for fall.  
The construction of dike between the cribs in the bay was begun June 26, 1905, mattresses being constructed at Ironville and stone being delivered to scows by rail from a quarry at Lime City, Ohio, opened specially for this purpose.  
Following is a summary of work under the contract:

*Straight channel through Maumee River and Bay—Contract, The Lydon & Drews Company, dated July 21, 1899.*

	Previously reported.	Fiscal year ending June 30, 1905.	Total to June 30, 1905.
<i>Dredging.</i>			
River division (H) .....cubic yards..	360,837		360,837
Inner division (I).....do.....	1,933,587		1,933,587
Middle division (J).....do.....	913,515	763,798	1,677,313
Outer division (K).....do.....	805,457	529,051	1,334,508
Total .....	4,013,396	1,292,849	5,306,245
<i>Dike construction.</i>			
Mattress.....square yards.....		273.10	273.10
Wall stone .....tons.....		58.92	58.92

Efficiency of dredges.

	July to November, 1904.			April to June, 1905.		
	Hours delay.	Hours work.	Cubic yards per hour.	Hours delay.	Hours work.	Cubic yards per hour.
No. 1.....	251:20	1,246:25	254	191:50	588:50	240
No. 8.....	256:55	1,240:50	282	167:40	532:20	257
No. 5.....	275:10	1,222:35	229	82:50	329:40	211

*U. S. dredge Maumee.*—In 1904 this dredge worked at Toledo only three days, July 14-16. During this time it removed 3,950 cubic yards of material from section 5 of the inner division along the axis of the Straight channel, where the most fill was found after the flood of 1904.  
During the balance of the season of 1904, after July 1, this dredge was engaged at Lorain, Sandusky, and Huron, and also in removing wreck of schooner *General Franz Sigel* off Stony Point, Michigan, referred to later in this report.  
The *Maumee* resumed work at Toledo May 5, 1905, in Division G, Maumee River, in continuation of the work of 1903, and is still engaged upon it, having removed 39,790 cubic yards. Owing to the very bad condition of scows, as well as a long tow, the work is considerably delayed, and the hours delay slightly outnumber those worked. During the working hours, the average output was 154 cubic yards per

hour, which could easily be nearly doubled were full scow capacity at hand to care for it.

Following is a tabular summary of the work of this dredge upon the 21-foot project:

*Straight channel through Maumee River and Bay—U. S. dredge Maumee.*

	Previously reported.	Fiscal year ending June 30, 1905.	Total to June 30, 1905.
	<i>Cubic yds.</i>	<i>Cubic yds.</i>	<i>Cubic yds.</i>
Division A.....	147,722	.....	147,722
Division C.....	305,108	.....	305,108
Division D.....	22,852	.....	22,852
Division E.....	113,615	.....	113,615
Division F.....	162,007	.....	162,007
Division G.....	80,658	39,790	120,448
Division I.....	6,194	3,950	10,144
Total.....	838,151	43,740	881,891

*Condition of channel.*—No examination of the channels has been possible this spring, but vessels drawing 19 feet are having no trouble in passing through. The general description of the conditions given in last year's report will still hold good except that in Division G the full width is completed to within 1,600 feet of the Wheeling and Lake Erie Railroad bridge, and the westerly side has been dredged to within 600 feet of the bridge; also that the full width of channel in the bay is completed from the mouth of the river to 4,800 feet outside the cribs, while the widening on the northwesterly side is finished for 12,800 feet outside the cribs.

WRECK SCHOONER "GENERAL FRANZ SIGEL."

This vessel foundered off Stony Point, Michigan, July 18, 1903, and it was not until July 19, 1904, that the dredge *Maumee* could be spared to work upon it. From that day until July 30 the wreck was dredged out, a few charges of dynamite being used to loosen it up. Considerable delay was encountered from bad weather, breaking an anchor, towing materials away, etc., so that there were but forty-nine and one-half hours' actual work. About 250 tons of coal was dredged from the hull and sold at public auction. The hull was broken up and towed ashore.

STOREHOUSE AND FLOATING PLANT.

The dredge *Maumee*, tug *Spear*, six dump scows, and the *Visitor* were placed in winter quarters at the United States slip, Toledo, early in December. Such regular employees as could profitably be used were retained for repairs and preparation for summer work.

The forward portion of cabin of *Visitor* was removed for change in boiler and was replaced afterward, the forward roof being entirely rebuilt of heavier material, with the intention of doing the same with the after portion next winter. Two 3-inch I beams were placed lengthwise over boiler room, engine room, and cabin, to better support carlings. Low-pressure cylinder was removed and valves trued up, and the entire machinery was overhauled and repaired.

The *Visitor* was on marine railway September 23-29 for annual scraping and painting of bottom, reseating of stern bearing, and general overhauling of hull. The old fire-box boiler, which had been in the vessel since it was built in 1892, became unserviceable, owing to the peculiar construction of its legs, so that the entire bottom required rebuilding. As this made it necessary to remove the boiler from the boat it was deemed wise to build a new one. This was purchased of the W. D. McNaul Water-Tube Boiler Company, of Toledo, and the design appeared to be fully efficient. Long delay was experienced in getting the boiler in place, and it was not until May 23 that it could be tested. A trial trip developed the fact that the draft was insufficient, and ever since then the makers have been experimenting with a view to making another which shall be free from the defects shown. This will be built some time this summer.

The boom of dredge was extensively repaired and strengthened, and a new base casting was made. A new dipper arm was made, the old one having been in service for about eight years. A 14-inch lathe was purchased and set up in dredge, and it paid for itself in a short time by saving of shop bills. Many of the cylinders were

rebored by use of a machine made by Richard Skeldon, engineer on tug *Spear*. Main and backing drums and anchor gears were removed and rabbitted. A new timber bed for hydraulic gear was placed.

The new hull of tug *Spear* having developed some weakness, fourteen tamarack knees were placed to stiffen it.

Three scows were sheathed over roofing felt to enable us to use them one more season. This work has proved satisfactory, in that it has strengthened and stiffened the old rotten sides, but this season is about the last which can be expected. The other three scows can be used by careful handling for one or two seasons, but their capacity is only about 200 yards each. There should be built at once two large scows of not less than 400 cubic yards capacity each, and four of them would no more than keep the dredge busy. The tug now tows 600 yards in three scows while the other three are loading, and the dredge is delayed nearly half its time, so that a tow of 800 yards, with the three old scows to fall back on, would be no more than required for the present tow of 9 miles. For the work in division A the tow will be 13 miles.

#### STEAMER "VISITOR" WITH SURVEY AND INSPECTION PARTY.

The steamer continued in active service until December 10, when the fleet had all been placed in winter quarters. On account of the delay in placing new boiler and the continued changes necessary in the attempt to make it serve until another can be obtained, the work has been greatly interfered with and delayed this season.

Capt. Alex. A. Stevenson, who had been in command of inspection vessels since April, 1888, was promoted to command the U. S. dredge *Burton* in the fall of 1904, and William Bowman, another old employee, was promoted to command the *Visitor*.

During the fiscal year, aside from the general inspection and routine work, the following work is worthy of mention:

Wreck of steamer *Philip Minch*, which burned off Sandusky November 19, 1904, and sank east of Middle Island, was found and partially examined. All marks having disappeared during the winter, the wreck was again located this spring from sextant angles and sweeping.

Toledo light-house was located by triangulation in connection with the system in Maumee Bay.

Soundings were taken and platted at Conneaut October 7, 1904.

Soundings were taken after dredging at Toledo over the middle division on lines 100 f at apart; also after the dredging done by U. S. dredge *Maumee* in inner division.

Stadia surveys for shore line changes were made at Bay Point and Dry Tree Point, and from Presqu'ile to Cedar Point, a distance of about 8 miles, in Maumee Bay.

Triangulation work scattered over the years 1887 to 1904 was compiled, reduced, and tabulated, as noted further on in this report.

#### WATER LEVELS.

On December 28, 1904, the water level at Toledo reached the lowest stage ever recorded, and the following report made to you is reproduced for record:

"At 7 a. m. December 28, 1904, the water level in Maumee River at Cherry Street Bridge reached the lowest stage ever recorded—8.5 feet below mean level. The surface remained at this level but a short time, when it raised about 1.5 feet, and then remained 7 feet below mean level until at least 4 o'clock of the same afternoon. Not only is this extreme stage unprecedented, but the level has never been known to remain as low as 7 feet for so long a period. The fall of water was due to a heavy and continued southwest gale, during which the maximum velocity was but 48 miles per hour (record for five minutes). The extreme velocity recorded at the weather office was 53 miles per hour (record for 1 mile). The prevailing level at this time was about 1 foot below mean level, and the actual fall therefore was 7.5 feet. During this storm the barometer at the weather office fell to 28.40, actual reading, and the only previous record exceeding this which is known was February 28, 1902, when it reached 28.22, actual reading.

"The lowest waters heretofore recorded were as follows: October, 1886, water fell 7.4 feet to 7 feet below mean level; October, 1887, water fell 7 feet to 7 feet below mean level; January, 1889, water fell 7.1 feet to 7.5 feet below mean level, and during this gale the water at Buffalo reached a stage of 7.8 feet above mean level, having risen 8.2 feet. This difference between Toledo and Buffalo—15.3 feet—was the greatest on record. October, 1892, water fell 6.9 feet to 7.5 feet below mean level; October, 1893, water fell 6.8 feet to 7.5 feet below mean level; November, 1895, water fell 5.3 feet to 7.2 feet below mean level.



"In this connection it may be stated that the highest stages of water recorded at Toledo, due to winds alone, were: April, 1893, water rose 5.9 feet to 5.4 feet above mean level; February, 1894, water rose 7.9 feet to 7 feet above mean level.

"Capt. Alex. A. Stevenson, master of U. S. dredge *Burton*, reports that at Sandusky, on December 28, the water dropped to 4.5 feet below mean level at 8 a. m., rising at 10 a. m. to 4.2 feet below, where it remained the rest of the day.

"Mr. Thomas W. Simpson, inspector at Huron, reports that at 11.30 a. m. on December 28, the water surface was 4.5 feet below mean level, which, according to the old citizens of Huron, was the lowest in forty years."

TRIANGULATION OF MAUMEE BAY AND RIVER.

In the Annual Report for 1890, page 2759, there was printed a report covering a triangulation of Maumee Bay, executed by the writer in 1888. That report contained a great many typographical errors, but they are not now material, as most of the points therein named have been destroyed by caving or rebuilding. Of the 12 stations then occupied, there now exist only Turtle Island light, Lone Tree, Red range, Manhattan, North base, and South base, and of these, Red range is hidden by two buildings so as to be unserviceable. Cedar Point 1877, Jamestown, Dry Tree Point (given in type Lone Tree Point), Presqu'ile and Grassy Point have all been washed away. Crib was destroyed in the rebuilding of lights and dwelling. Windmill 1888 is also destroyed. Five new light-houses have been built, two on Straight Channel range at Manhattan, two on Straight Channel range in bay, and the Toledo light-house at outer end of Straight channel.

In order to maintain accuracy of charts and follow changes in shore line, a new set of points was established through the bay and continued up Maumee River as far as improvements by the General Government extend. These points have been occupied at various times since 1892 as time could be spared from other duties. The computations have now been completed, and the results are given herein reduced to the geodetic datum established recently and published in the report of the United States Lake Survey, Annual Report of Chief of Engineers, 1902.

In 1892 the system was extended up the river to the line Buffalo street-Rolling mill; in 1894, to the line Backus '96-Wabash, and in 1901 to the line Ford-Schenck. In the fall of 1902 the greater part of the new work in the bay was done, but parts of it were executed in 1901, 1903, and 1904.

Except in the light-houses and on roofs, nearly all the observations were taken from built stations 8 to 12 feet high, and where possible the target was made of 2 or 3 inch strip of iron twisted around its axis so as to show a flat face in three directions, these being painted black and white alternately. This form of target has not the translucent quality of that made of cloth, described in report of 1890, but it is much more serviceable and can generally be seen in any weather fit for observing.

It has been necessary to use some of the old work of 1888 to connect up at each end of the bay, and in this work the Würdeman Gambey 10-inch theodolite was used. All other work herein described was executed with the Buff & Berger transit No. 743, reading by 2 verniers to 30 seconds, and easily by estimation to 15 seconds, on a 6½-inch circle. All readings were made by the repetition method, as best adapted to existing conditions. In general, a reading was taken after 6 repetitions equally divided between direct and reverse, and a second reading after 6 more pointings; this was repeated in negative direction back to point of beginning. These 4 angles seldom varied more than 5 seconds, and very often not more than 3 seconds. If the variation was over 6 seconds, it usually indicated errors, which were sought out.

The work in the bay is of fairly good quality, the triangle closures ranging from 0.0 to 4.2 seconds.

Closures were:

	Seconds.
In 2 triangles (both in quadrilateral) .....	4.2
In 2 triangles .....	3.3 to 3.4
In 1 triangle .....	2.3
In 14 triangles.....below..	2.0
Algebraic sum of closures in 19 triangles .....	-0.5
Average closure .....	1.43

In the river system the work was not so good. Much of it was done in very bad weather, often unprotected from snow squalls, and there appears to have been some constant drag in the instrument.

Closures were:

	Seconds.
In 3 triangles .....	5.7 to 6.6
In 6 triangles .....	3.2 to 4.8
In 12 triangles.....	below.. 3.0
Algebraic sum of closures .....	-31.0
Average closure .....	2.74

Angles were locally adjusted for horizon closure at each station, and then for triangle closure. In the bay system, one quadrilateral, point-middle range-case-State line was adjusted by least squares, and the large polygon of 6 triangles centered on west tower was adjusted for all circuits. At west tower it was necessary to use two eccentric positions in order to observe on all surrounding stations. These, reduced to center, were adjusted for horizon, outer angles in triangles were adjusted for circuit, and then each triangle independently for closure. The result fulfilled the angle conditions of polygon and triangles perfectly. Turtle Island light-house, Toledo light-house, west tower, east tower, Manhattan front, and Manhattan rear were all occupied in eccentric positions, and with excellent results after reduction to center.

In the river system the work not showing satisfactorily, the line Backus '96-Line fence was measured with the standard Chesterman steel tape used for the Ironville base in 1888, and by the same method. Measurements reduced to sea level were:

	Feet.
First .....	3,166.309
Second .....	3,166.299

Mean..... 3,166.304

or reduced to meters, using 3.28087, 965.0811 meters; length computed from Ironville base, 965.1662 meters; difference in logarithm, 384 in seventh place.

The system between measured lines was then adjusted by least squares and the corrected angles substituted for computation, resulting as follows: Line fence-Backus '96, measured 965.0811, logarithm, 2.9845638; computed, 965.0816, logarithm, 2.9845640.

Geodetic computations were made by use of United States Coast and Geodetic Survey tables based on Clarke spheroid.

For checks on the work, there are found:

1. Position of St. Mary's Church as determined by angles from rolling mill and Platt, also azimuth Cedar Point 1877 to St. Mary's Church, by inverse computation from their positions as determined from this triangulation, were: Latitude,  $41^{\circ} 39' 32.855''$ ; longitude,  $83^{\circ} 32' 2.878''$ ; azimuth,  $71^{\circ} 5' 58.09''$ ; distance, 17,535.85 meters; whereas these are given in the United States Lake Survey report, 1902, .853, .895, 58.51, 17,536.21 meters indicating differences of position, in latitude, 0.05 meter; in longitude, 0.39 meter; in distance from Cedar Point 1877, 0.36 meter, while the azimuth from Cedar Point 1877 is practically exact. This test is on a line crossing almost the entire system, and is quite remarkable, considering that no attempt was made for extreme accuracy and that the observations were taken rapidly, often in bad weather, with an ordinary form of field transit, and usually under pressure of other duties.

2. The original axis of Straight channel was laid from old Main Crib light to a church spire on the corner of Canton and Scott streets, called in the work Straight Channel Church. The east and west towers, and the two Manhattan Range lights were placed as nearly as practicable on this line, as were the triangulation stations Manhattan and Grassy Point. Straight Channel Church was determined by angles from rolling mill and Platt. Inverse computation from computed positions of West tower and Straight Channel Church gives azimuth, west tower-Straight Channel Church,  $57^{\circ} 44' 59.7''$  and by direct observation at west tower it is  $57^{\circ} 45' 2.7''$ , the difference of  $3''$  being but a little over 8 inches.

3. Inverse computation from positions of west tower and Manhattan front gives azimuth  $57^{\circ} 44' 54.4''$ , indicating that Manhattan front is about 8 inches south of the line west tower-Straight Channel Church. This agrees with a previous computation showing that Grassy Point was about  $7\frac{1}{2}$  inches south of the same line, and this station was used in locating the light-house.

4. The distance Cedar Point 1877 to Turtle Island light-house, as computed through 16 triangles from Ironville base, applied to the position of Cedar Point 1877 and azimuth to Turtle Island light-house given in Lake Survey report 1902, gives the position of Turtle Island light-house in latitude and longitude to 3 decimals, agreeing with the published position given in 2 decimals.



5. The computation of distances in the polygon centering at west tower through 6 triangles differed only 15 in the seventh decimal of logarithm, and this error was distributed evenly through the triangles.

To summarize, the distances depend on the length of base at Ironville, measured in feet in 1888, description of which is given in the Annual Report of the Chief of Engineers, 1890, page 2761. Its length, reduced to sea level, is 5,768.488 feet, logarithm, 3.7610620; 1,758.2193 meters, logarithm, 3.2450731, using for reduction to meters, 3.28087, logarithm, 0.5159889.

Positions depend on that of Cedar Point 1877 (also used in 1888), as given in United States Lake Survey report for 1902, viz, latitude  $41^{\circ} 42' 37.595''$ ; longitude,  $83^{\circ} 20' 5.834''$ ; azimuth, Cedar Point 1877-Stony Point,  $193^{\circ} 28' 7.74''$ .

A sketch <sup>a</sup> on tracing cloth accompanies this report, upon which are shown the relative positions of triangulation points herein described. The results of the work are given in the following table, and the computations in detail are on file, bound together for preservation.

Very respectfully,

WM. T. BLUNT,  
*United States Assistant Engineer.*

Lieut. Col. DAN C. KINGMAN,  
*Corps of Engineers.*

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<sup>a</sup> Not printed.

TOLEDO HARBOR, OHIO.

Table of positions, azimuths, and lengths.

Station.	Latitude and longitude.	Seconds in meters.		Azimuth.		To station.	Back azi- muth.		Distance.		Loga- rithm.	
				°	'				Meters.	Feet.	Meters.	Feet.
Cedar Point 1877.....	41 42 37.595	1,159.8	691.2	814	53	Cedar Point 1877 .....	134	55	6,596.620	21,642.65	3.8193215	4.8358104
Turtle Island light-house...	83 20 05.894	264.0	1,262.2		41.9	Turtle Island light-house.....	60	09	3,022.373	9,916.01	3.4808481	3.9963870
Lone tree.....	41 45 08.558	646.1	1,567.0	240	08	State line .....	245	28	2,951.944	9,717.75	3.4715768	3.9875657
West tower.....	83 23 27.967	610.8	1,740.1	65	29	Manhattan front.....	237	41	7,754.900	25,442.81	3.8895762	4.4055651
	41 44 19.797	610.8	1,240.3	57	44	Lone tree .....	292	59	2,574.863	8,447.79	3.4107542	3.9267431
	83 25 21.416	494.9	891.6	113	01	Turtle Island light-house.....	5	43	2,523.408	8,278.97	3.4019675	3.9179764
	41 43 47.175	1,455.4	488.5	185	43	East tower .....	57	44	378.800	1,242.79	2.5784104	3.0943993
	83 23 38.863	898.2		237	44	Straight Channel Church spire.....	237	39	14,188.80	46,887.5	4.1504122	4.6664011
Cedar Point fill.....	41 42 36.671	1,131.3	719.7	57	45	West tower .....	296	18	4,905.934	16,095.73	3.6907217	4.2067106
South shore.....	83 20 28.628	661.8	725.3	116	20	Turtle Island light-house.....	318	29	6,255.997	20,525.10	3.7962965	4.3122854
Case.....	41 41 31.884	963.6	867.4	138	31	West tower.....	0	54	4,174.500	13,695.99	3.6206045	4.1365934
	83 23 41.748	965.4	422.1	180	54	Cedar Point fill.....	65	54	4,892.801	16,051.00	3.6935132	4.2055021
	41 41 45.348	1,399.0	452.0	245	52	West tower.....	48	27	5,665.636	18,588.21	3.7532487	4.2692376
State line.....	83 26 42.244	976.8	410.6	228	25	South shore.....	95	41	4,194.517	13,761.66	3.6226820	4.1386709
East tower.....	41 43 39.952	1,232.6	618.5	275	39	West tower .....	87	30	5,070.100	16,634.33	3.7050165	4.2210064
	83 27 18.020	416.5	970.2	267	27	Case.....	166	50	3,631.163	11,913.87	3.5600456	4.0760846
	41 43 53.728	1,657.6	198.5	346	49	Lone tree .....	236	38	2,807.978	9,212.61	3.4483987	3.9643826
Toledo light-house .....	83 23 25.002	577.8	808.8	106	39	Turtle Island light-house.....	358	17	2,809.666	7,577.71	3.3635493	3.8795382
Point.....	41 45 42.560	1,023.3	538.0	178	18	Cedar Point fill.....	190	07	5,825.765	19,113.57	3.7653580	4.2813419
	83 19 44.300	1,023.8	362.7	10	07	West tower.....	236	40	6,484.360	21,274.33	3.8118671	4.3278560
	41 41 45.211	1,894.8	456.3	56	43	State line .....	6	25	3,562.368	11,637.66	3.5517388	4.0677277
	83 27 35.279	815.8	571.6	186	25	Case.....	39	48	1,226.381	4,023.60	3.0886254	3.6046143
Middle range.....	41 42 28.692	885.2	965.9	269	47	Middle range .....	319	26	1,765.760	5,793.23	3.2469316	3.7629205
	83 28 24.938	576.6	810.6	139	26	State line .....	35	08	2,688.146	8,819.45	3.4294528	3.9454417
Manhattan front.....	41 41 32.942	1,016.3	834.8	299	22	Case.....	119	23	2,725.113	8,940.74	3.4353845	3.9513784
North base.....	83 28 22.468	519.5	868.0	319	26	Point .....	139	26	1,765.760	5,793.23	3.2469316	3.7629206
	41 41 00.947	29.2	1,821.8	178	06	Middle range .....	358	06	1,720.924	5,646.13	3.2357617	3.7517506
Manhattan rear.....	83 28 11.610	268.5	868.0	250	51	Point .....	70	52	1,155.000	3,789.40	3.0625820	3.5785709
	41 41 14.604	450.6	1,119.2	165	43	Manhattan front.....	345	43	1,018.547	3,841.72	3.0079611	3.5239700
Presqu'ile.....	83 29 01.158	26.8	1,119.2	211	35	Point .....	31	36	1,603.394	5,260.49	3.2050376	3.7210265
	41 41 45.364	1,399.5	1,400.5	237	41	Manhattan front.....	57	41	1,053.617	3,473.18	3.0247389	3.5407278
Grassy Point.....	83 27 35.678	825.0	1,360.8	290	11	North base.....	110	11	1,220.982	4,005.72	3.0866915	3.6026804
	41 41 28.172	869.1	451.5	31	14	.....do.....	211	13	1,602.620	5,257.99	3.2043906	3.7208195
Manhattan .....	83 28 32.536	752.4	562.4	70	29	Manhattan front.....	250	29	1,147.859	3,765.97	3.0598885	3.5758774
	41 41 14.435	445.3	981.9	248	01	Presqu'ile.....	68	02	1,417.786	4,651.57	3.1516106	3.6675995
	83 29 01.516	35.1	635.1	330	02	North base.....	150	03	969.397	3,180.46	2.9865015	3.5024904
			1,405.7	237	41	Grassy Point.....	57	41	792.982	2,601.60	2.8992523	3.4152412
			1,352.5	289	49	North base.....	109	49	1,226.936	4,025.42	3.0889218	3.6048107

TOLEDO HARBOR, OHIO—continued.  
Table of positions, azimuths, and lengths—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	To station.	Back azi- muth.	Distance.	Loga- rithm.	Distance.	Loga- rithm.
	° ' "		° ' "		° ' "	Meters.	Meters.	Feet.	Feet.
South base.....	41 40 17.897	552.2	179 55 32.8	Manhattan.....	359 55 32.7	1,744.304	3.2416221	5,722.83	3.7576110
Ironville .....	83 29 01.418	32.8	220 56 05.1	North base.....	40 56 38.2	1,758.2198	3.2450731	5,768.488	3.7610620
	41 40 46.577	1,437.0	164 01 58.6	Manhattan.....	344 01 51.5	893.973	2.9518243	2,933.01	3.4673132
	83 28 50.883	1,176.9	248 58 49.1	North base.....	63 59 15.2	1,010.758	3.0046474	3,316.17	3.5206363
Kelsey.....	41 40 44.962	1,387.1	221 28 11.6	Manhattan.....	41 28 34.7	1,213.590	3.0840722	3,981.63	3.6000611
	83 29 36.266	838.8	267 16 42.1	Ironville .....	87 17 12.3	1,050.901	3.0215618	3,447.87	3.5375507
Craig .....	41 40 04.202	129.7	187 52 51.8	Kelsey .....	07 52 56.8	1,269.505	3.1036343	4,165.08	3.6196232
	83 29 43.792	1,013.2	223 06 25.6	Ironville .....	43 07 00.8	1,790.824	3.2530629	5,875.46	3.7690418
Park.....	41 39 57.784	1,782.7	223 42 46.9	Kelsey .....	48 43 26.9	2,013.870	3.3040814	6,607.24	3.8200203
	83 30 36.434	842.9	260 45 38.4	Craig.....	80 46 13.4	1,283.828	3.0912548	4,048.03	3.6072437
Schuller .....	41 40 28.207	870.2	336 47 21.2	.....do.....	156 47 30.8	805.785	2.9062244	2,643.71	3.4222183
	83 29 57.520	1,330.5	43 48 29.6	Park .....	223 48 03.7	1,900.505	3.1141120	4,266.79	3.6301009
Malleable .....	41 39 45.788	1,412.6	119 15 11.2	.....do.....	299 14 52.2	757.407	2.8793234	2,484.95	3.3953183
	83 30 07.870	182.1	190 22 08.7	Schuller .....	10 22 10.6	1,830.896	3.1239809	4,864.86	3.6399698
Rolling mill.....	41 39 16.790	518.0	199 23 28.0	Park .....	19 23 40.8	1,840.794	3.1273619	4,398.97	3.6433508
	83 30 55.676	1,288.2	231 01 45.1	Malleable .....	51 02 16.9	1,422.614	3.1530871	4,667.41	3.6690760
	41 39 43.608	1,345.4	266 19 34.2	.....do.....	86 20 04.3	1,050.865	3.0215469	3,447.75	3.5375358
Buffalo street.....	83 30 53.198	157.4	3 57 51.2	Rolling mill .....	183 57 49.6	829.356	2.9187410	2,721.01	3.4347299
	41 39 23.642	1,121.7	232 51 53.9	Buffalo street .....	52 52 17.3	1,020.434	3.0087850	3,347.91	3.5247739
Woodwork .....	83 31 28.360	656.2	285 36 49.3	Rolling mill .....	105 37 11.0	785.239	2.8950021	2,576.27	3.4109910
	41 38 55.107	1,700.1	176 39 20.8	Woodwork.....	356 39 19.3	881.845	2.9453923	2,898.22	3.4613812
Platt .....	83 31 26.137	604.8	226 29 38.1	Rolling mill .....	46 29 58.3	971.761	2.9875593	3,188.22	3.5035482
	41 38 49.041	1,513.0	217 48 39.4	Woodwork.....	37 49 03.2	1,351.250	3.1307357	4,433.27	3.6467246
Lake Shore .....	83 32 04.162	96.3	257 59 23.3	Platt .....	77 59 48.6	899.637	2.9540675	2,951.59	3.4700564
	41 38 29.649	914.7	147 40 10.6	Lake Shore .....	327 39 59.7	708.052	2.8500649	2,323.02	3.3660538
Line fence.....	83 31 47.799	1,106.3	212 32 49.1	Platt .....	32 33 08.5	931.779	2.9693123	3,057.04	3.4853017
	41 38 21.181	653.5	181 35 14.0	Lake Shore .....	01 35 14.7	859.848	2.9344215	2,821.05	3.4504104
Wabash .....	83 32 05.191	120.2	287 00 52.8	Line Fence .....	57 01 04.4	479.866	2.6811202	1,574.38	3.1971091
	41 37 58.427	1,802.6	146 38 02.2	Wabash .....	326 37 48.9	840.549	2.9245632	2,757.73	3.4405521
Backus, '96 .....	83 31 45.217	1,046.6	176 27 00.1	Line fence .....	356 26 58.4	965.0816	2.9845640	3,166.31	3.5005529
	41 37 57.393	1,770.6	172 34 04.6	Wabash.....	352 34 01.9	740.103	2.8692921	2,428.18	3.3852810
Lake Shore fill.....	83 32 01.065	24.4	265 01 34.3	Backus '96 .....	85 01 44.8	367.980	2.5658238	1,207.29	3.0818127
	41 37 56.617	1,746.7	219 14 40.1	Wabash.....	39 14 57.9	978.552	2.9905337	3,210.50	3.5065726
Fassett .....	83 32 31.939	739.3	267 02 26.4	Backus '96 .....	87 02 57.4	1,082.902	3.0345391	3,552.86	3.5505780
	41 37 18.066	557.4	155 37 49.9	Fassett.....	335 37 34.4	1,305.686	3.1153388	4,283.79	3.6318277
Dayton .....	83 32 08.664	200.6	203 32 59.7	Backus '96 .....	23 33 15.3	1,358.311	3.1329992	4,556.44	3.6489881
	41 37 38.760	1,195.8	252 06 00.4	.....do.....	72 06 54.3	1,974.895	3.2955439	6,479.37	3.8115328
Schenck .....	83 33 06.410	148.4	295 31 22.5	Dayton .....	115 32 00.9	1,481.386	3.1706678	4,860.23	3.6865567
	41 37 05.370	165.7	195 30 26.6	Schenck .....	15 30 34.8	1,069.080	3.0289898	3,507.35	3.5449757
Ford.....	83 33 18.756	434.2	256 25 22.3	Dayton.....	76 26 08.9	1,669.314	3.2223381	5,476.80	3.7385270
			214 25 31.4	Fassett.....	84 26 02.3	1,916.825	3.2825825	6,288.85	3.7985714

Stations not occupied.	St. Mary's Church.....	41 39 32.855	1,013.6	837.4	287 40 24.0	Rolling mill.....	107 41 09.0	1,631.984	3.212715*	5,954.82	3.7287047
		83 32 02.878	66.6	1,321.6	323 52 02.0		143 52 26.0	1,441.876	3.1589278	4,730.61	3.6749167
Straight Channel Church.....	Straight Channel Church.....	41 39 42.304	1,305.1	545.9	250 58 01.2	Cedar Point 1877 .....	71 05 53.1	17,535.85	4.2439267	57,532.80	4.7599156
		83 32 15.696	363.1	1,025.1	293 01 31.0		113 02 24.0	2,011.823	3.3035898	6,600.53	3.8195787
Windmill 1903.....	Windmill 1903.....	41 39 42.304	363.1	1,025.1	321 46 26.0	Rolling mill.....	141 46 59.0	1,853.419	3.2679736	6,030.82	3.7839625
		83 32 15.696	363.1	1,025.1	237 39 15.9		57 44 59.7	14,138.80	4.1504123	46,387.53	4.6664012
Waterworks tower.....	Waterworks tower.....	41 43 15.061	464.7	1,386.4	242 40 32.0	West tower.....	62 42 23.0	4,363.260	3.6398146	14,282.48	4.1549035
		83 28 08.780	203.0	1,183.9	297 15 02.0		117 18 00.0	6,946.129	3.8417428	22,789.34	4.3577317
Mitchell & Rowland corner...	Mitchell & Rowland corner...	41 37 29.326	904.7	946.3	247 19 06.0	South shore .....	67 20 04.0	2,184.207	3.3392937	7,166.10	3.8552326
		83 33 59.006	1,365.9	23.0	308 24 59.0		128 25 26.0	1,189.318	3.0752979	3,902.00	3.5912863
Elevator No. 5 corner .....	Elevator No. 5 corner .....	41 37 39.604	1,221.8	629.2	346 26 16.0	Ford .....	166 26 21.0	633.518	2.3847497	2,242.53	3.3507386
		83 32 15.587	960.8	1,023.1	54 10 04.0		234 09 22.0	1,803.868	3.2562047	5,918.26	3.7721936
		41 37 34.931	1,077.6	773.4	298 46 20.0	Dayton.....	118 46 47.0	1,040.834	3.0337591	3,546.08	3.5497480
		83 32 49.587	1,147.9	241.1	36 31 11.0		216 30 52.0	1,134.774	3.0649096	3,723.05	3.5708984

## DESCRIPTION OF STATIONS.

*Cedar Point 1877.*—United States Lake Survey primary station, described on page 434, Professional Papers, Corps of Engineers, No. 24, 1882. Used in triangulation of 1888. Washed away several years ago.

*Turtle Island light-house.*—United States Lake Survey secondary point, given on page 799, Professional Papers, No. 24. Iron finial where it enters ball on light-house lantern, built on southerly end of brick dwelling, on Turtle Island at entrance to Maumee Bay. Eccentric station occupied is marked by a punch hole in iron platform, southwest corner, located by measurements from posts, which are shown on sketches. This light house and the island have recently been sold to private parties, the light having been discontinued.

*Lone tree.*—On flat land, Bay Point, north side of entrance to Maumee Bay, 700 feet southerly from heavy timber. Stump of willow close to station. No surrounding points for location. Marked by rough stone monument, 6 by 6 inches by 4 feet. Triangle around hole and letters "U. S." on top.

*West tower.*—Southwest steel tower of Bay range, Straight channel, carrying a double light. Point is finial of upper light, where it enters ball. Two eccentric stations were used at this light, one north of center and one south of center, each marked by a cross chiseled on diagonal blank smooth seam of upper square iron platform. Measurements on sketches.

*East tower.*—Northeast steel tower, carrying one light, on axis of Straight channel in Maumee Bay. Point is finial of tower where it enters ball. Eccentric point occupied is north of center, marked by a cross chiseled on diagonal blank smooth seam of iron platform. Measurements on sketch.

*Toledo light-house.*—Round tower on brick dwelling, concrete superstructure over timber crib, at entrance to Maumee Bay, first lighted in 1904. Point is finial where it enters ball. Eccentric station is a cross chiseled on raised diamond of checkered iron floor on platform around lantern. This floor is in 8 sections, one joint being on line to west tower. The first joint north of this is in front of the door; the second section south of the west tower contains eccentric point nearly in its middle.

*Cedar Point fill.*—On Cedar Point, southerly side of entrance to Maumee Bay, on sand flat formed by the shifting of Cedar Point into Maumee Bay, 527 meters west and 28 meters south from Cedar Point, 1877; marked by a 1½-inch square iron rod 3½ feet long with one-fourth-inch hole one-half inch deep, and letters "U. S." on top.

*South shore.*—On south shore of Maumee Bay, near Jamestown, 3½ miles easterly from mouth of Maumee River, about 30 feet from shore, in heavy woods, 70 feet east from cultivated lands. Station caved away in 1905.

*Case.*—On southerly shore of Maumee Bay, about 4,000 feet easterly from Presqu'ile at mouth of river. On land owned by Shepard, 115 feet east of property line between Shepard and Case, on line of eighth row of peach trees from property line. Marked by a 1½-inch square iron rod 4 feet long, with one-fourth-inch hole one-half inch deep and letters "U. S." on top.

*State line.*—On Dry Tree Point, west shore of Maumee Bay, 2½ miles from mouth of river, one-fourth mile south of Michigan-Ohio State line. On land occupied by a dynamite factory, 150 feet northeast from inner end of trestle carrying railroad to landing. Station will probably be washed away during 1905.

*Point.*—On Presqu'ile at mouth of river, right bank. After Station Presqu'ile caved away this station was placed farther back, but it also caved away in 1905.

*Middle range.*—West shore of Maumee Bay, 1 mile from mouth of river, about 60 feet southerly from range of discontinued lights formerly carrying a red range for the old channel. On low ground made by natural fill. Station is marked by 1½-inch square iron rod 4 feet long with one-fourth-inch hole one-half inch deep and letters "U. S." on top.

*Manhattan front.*—At the mouth of Maumee River, left bank, at the outer point of Bay View Park, being the front light of the Manhattan range on axis of Straight channel; square wooden tower on iron pile caps. Eccentric point used is on square lantern platform east of lantern, measurements given in sketches.

*Manhattan rear.*—Rear light of the Manhattan range, on axis of Straight channel, on edge of bank at mouth of canal at North Toledo; square wooden tower on piles. Eccentric station is east of light, on square platform. Measurements given in sketch.

*North base.*—On the right bank of Maumee River, 150 feet from bank, on cultivated land, peach orchard having been destroyed. Five-eighths of a mile below Ironville dock, operated by the Wheeling and Lake Erie Railroad Company, and on point of land between Duck Creek and the river, 750 feet above upper end of highway bridge over Duck Creek. Marked by a surface stone 6 by 6 inches by 2 feet, rough dressed on top, with a cross and letters "U. S." on top. Subsurface mark is

a sandstone 6 by 6 by 30 inches, dressed top and 4 inches down the sides, three-eighths-inch steel plug with cross on its oval top, set in Babbitt metal, "U. S." on one side of the stone and "B. L." on the opposite; top of this stone 2 feet below the surface.

*South base.*—On property of the Wheeling and Lake Erie Railroad, near station "Ironville," right bank of Maumee River, 137.5 feet east from northeast corner of station building, 38 feet northeast from axis of main track, 13.5 feet southeast of the last telegraph pole of the line of poles from the eastward; going west, the poles are set farther apart. Tracks, railroad station, and highway have been changed since 1890. Surface and subsurface marks same as for north base.

*Presqu'ile.*—On Presqu'ile, at mouth of river, right bank. Station caved away in 1901.

*Grassy Point.*—On Grassy Point, near mouth of river, left bank; one of the original points on axis of Straight channel. Station caved away, and the location is now occupied by Bay View Park.

*Manhattan.*—On left bank of Maumee River, north bank of old canal, at North Toledo. On axis of Straight channel, 4.2 feet northwest of an old canal monument, 32 feet southwest from Manhattan Rear Range light. Marked by stone monument, 6 by 6 inches, dressed top, and 4 inches down the sides, hole surrounded by triangle and letters "U. S." on top.

*Ironville.*—On the Ironville wharf, occupied by the Wheeling and Lake Erie Railroad, right bank of Maumee River, below Wheeling and Lake Erie Railroad bridge. After being used in triangulation of 1892, the station was destroyed by the rebuilding of railroad property.

*Kelsey.*—The station was on top of bluff on left bank of river, foot of Haynes avenue, about 800 feet below the Wheeling and Lake Erie Railroad, on property belonging to the Kelsey and Freeman Lumber Company. The station was destroyed in enlarging the lumber yard.

*Craig.*—On right bank of river, about 400 feet below Craig shipyard, 33 feet west of west face of National Milling Company elevator, produced. Now on property of the Toledo Furnace Company. Marked by a stone monument 6 by 6 inches, triangle around hole, and letters "U. S." on top.

*Park.*—In Riverside Park, left bank of Maumee River, in grass about 5 feet east of stone sidewalk, 355 feet from nearest corner of Summit street and River place, 242 feet from nearest corner of Summit street and Buckeye street. On the southwest line of Bissell property, produced across Summit street. Marked by a stone 6 by 6 inches by 4 feet long, with triangle around hole, and letters "U. S." on top.

*Schuller.*—On Schuller wharf, left bank of Maumee River between Sandusky and Cleveland streets, 400 feet from Summit avenue, 89 feet from the southeast corner and 179 feet from northeast corner of wharf. Station mark same as that for Park.

*Malleable.*—On right bank of river, about 140 feet above the upper property line of the National Malleable Castings Company, 50 feet from the steep bank. Station mark same as that for Park.

*Rolling mill.*—On right bank of Maumee River, in front of the Maumee Rolling Mill, large building, 25.7 feet from its river face, about the middle of its length, 36 feet below the southwest line of Magnolia street, produced across the river. Station mark same as that for Park.

*Buffalo street.*—On left bank of river between stone sidewalk and fence, southeast side of Summit street, 222 feet below the northeast line of Stickney avenue, produced across the street, about midway between Stickney avenue and Buffalo street, 0.7 foot from fence and 2.85 feet from sidewalk. Station mark same as that for Park.

*Woodwork.*—On flat roof of brick mill of the Toledo Carriage Woodwork Company, south corner of Water and Cedar streets, left bank of river. Roof is surrounded by a brick parapet wall 12 inches thick. Station marked by a copper tack with cross on its head driven in gravel roof, 5.14 feet from the nearest face of Cedar street wall, 10.62 feet from the nearest face of the Water street wall, 11.53 feet from the nearest corner of brick chimney 8½ feet square.

*Platt.*—On roof of brick building with stone front on southwest side of Main street, between Front street and the Pennsylvania Railroad tracks, East Toledo, owned by H. P. Platt. Station is 100 feet from Front street. Parapet wall projects above the roof. Station is marked by a copper tack driven in gravel roof, 2.43 feet from the nearest face of Main street wall, 3.69 feet from the nearest face of northwest wall, 5.86 feet from the nearest corner of chimney in northwest wall, 20.17 feet from nearest corner of chimney in middle of building.

*Lake Shore.*—On roof of Lake Shore and Michigan Southern Railway freight house, Goose Point, between Dayton Bayou and Maumee River, at northeast end of brick building 75 by 50 feet, about 100 feet southwest from southwest line of Monroe street



produced, 1.95 feet from face of chimney, which is 1.4 feet square. Station marked by copper tack driven in tin ridge cover.

*Line fence.*—On right bank of river, on land owned by H. P. Platt, 2.5 feet south of line fence running east from River road to Yondota street, 340 feet from Yondota street, 250 feet from large stone monument with a cross on top, standing at the junction of this fence and the River road, 490 feet above Woodville street. Station mark same as for Park.

*Wabash.*—On left bank of river, south end of Wabash lake freight house. On ridge over first roof truss from the south end of the building, tin roof with raised seams. First cross seam south of north face of square tower with pole in center. Station is marked by strip of lead turned over ridge seam, with hole in top, copper tack through it and the seam horizontally, 26.77 feet from northwesterly corner of tower.

*Backus '96.*—On right bank of Maumee River just below Lake Shore and Michigan Southern Railway bridge, on land formerly occupied by the Union Elevator (A. L. Backus & Son), about 50 feet west of northwest corner of elevator, since destroyed by fire, and 6 feet south of its north face produced. About 200 feet below Miami Street Bridge over Lake Shore and Michigan Southern Railway. Eight feet south of south property line of East Side Iron Elevator Company, and 70 feet from Miami street. Station mark same as that for Park.

*Lake Shore fill.*—On left side of river, on embankment of the Lake Shore and Michigan Southern Railway, north side of track, marked by an oak stake and used only for quadrilateral to check length line fence—Backus '96. Destroyed in relaying of tracks.

*Fassett.*—On left bank of river on edge of bluff at beginning of Fassett Street Bridge. On axis of Fassett Street Bridge, produced westerly, and on the north line of Walbridge avenue, about 19 feet from the bridge rail, 42.8 feet from the nearest corner of the extreme westerly post of the north rail. Station marked by 1½-inch square iron rod, 4 feet long, with one-fourth inch hole one-half inch deep and the letters "U. S." on top.

*Dayton.*—On right bank of river in abandoned roadway along bluff, 650 feet above the highway bridge over the Cincinnati, Hamilton and Dayton tracks, 3,300 feet above the Fassett Street Bridge, 29.5 feet from the first telephone pole above the angle in the line of poles, 280 feet up river from the gas regulator in octagonal building which stands in front of property containing a red brick house, owned by Mrs. Barber. Station mark same as for Fassett.

*Schenck.*—On left bank of river, top of bank between Wabash Railway and Orchard street, about 155 feet up river from the northeast end of Schenck coal chute, produced northwesterly, about 430 feet up river from Maumee avenue, measured along bank, and 70 feet south of south line of Orchard street. Station mark same as for Fassett.

*Ford.*—On right bank of Maumee River at Ford Plate Glass Works, Rossford, Ohio, about in the center of made island in front of largest brick building, and on line of its upper face, produced, 256.45 feet from its corner. Station mark same as for Fassett.

*St. Mary's Church.*—Spire of St. Mary's Catholic Church, corner Michigan and Cherry streets. Primary point, United States Lake Survey. Not occupied.

*Straight Channel Church.*—Spire of Erste Deutsche Evangelische Reformirte Zions Kirche, northeast corner Canton and Scott streets. Brick church, octagonal spire, slated, galvanized trimmings, on axis of Straight channel produced. Not occupied.

*Waterworks tower.*—Standpipe for Toledo waterworks in front of pumping station on Broadway, left bank of Maumee River. Not occupied.

*Mitchell and Rowland corner.*—The extreme southeasterly corner of Mitchell & Rowland lumber wharf, on left bank of the river. Not occupied.

*Elevator No. 5 corner.*—Southeast corner Wabash elevator No. 5, left bank of Maumee River. Not occupied.

*Windmill '03.*—On west shore of Maumee Bay, about 1,500 feet north of the old white range, about 4,500 feet west of Dry Tree Point. Not occupied.

Very respectfully,

WM. T. BLUNT,  
United States Assistant Engineer.

Lieut. Col. DAN C. KINGMAN,  
Corps of Engineers.

P P 2.

IMPROVEMENT OF PORT CLINTON HARBOR, OHIO.

The location and early history of this work are given upon pages 2647 and 2648, Report of Chief of Engineers, 1898.

The funds available at the beginning of the fiscal year 1905 amounted to only \$75.91 and were not sufficient to permit any work to be undertaken. An examination of the channels was made on June 15, 1905, and shows good depths throughout. In the inner harbor there is a navigable depth of not less than 11 feet, between the jetties not less than 13 feet, and outward to deep water in the lake not less than 12 feet.

The river and harbor act of March 3, 1905, appropriated \$2,000 for maintenance at this place. The appropriation was quite small and in order to secure better prices it was deemed advantageous to combine the work at this harbor and that at the harbor of Vermilion in one contract. Plans and specifications were prepared with this object in view and proposals invited, and a contract awarded to the Buckeye Contracting Company, of Cleveland, Ohio, for the work at both harbors. Up to the end of the fiscal year no work had been done under the contract.

Money statement.

July 1, 1904, balance unexpended .....	\$75. 91
Amount appropriated by river and harbor act approved March 3, 1905. ....	2, 000. 00
	<hr/>
	2, 075. 91
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	115. 01
	<hr/>
July 1, 1905, balance unexpended .....	1, 960. 90
July 1, 1905, outstanding liabilities .....	100. 00
	<hr/>
July 1, 1905, balance available .....	1, 860. 90
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	2, 500. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

AMOUNT AND DATE OF ALL APPROPRIATIONS.

July 10, 1872.....	\$8, 000. 00	July 13, 1892.....	\$10, 000. 00
July 10, 1872 (allotment) ....	2, 000. 00	August 18, 1894 .....	6, 000. 00
March 3, 1875.....	5, 000. 00	June 3, 1896 .....	6, 000. 00
August 14, 1876 .....	5, 000. 00	March 3, 1899.....	6, 000. 00
June 18, 1878 .....	10, 000. 00	June 13, 1902 .....	5, 000. 00
March 3, 1879.....	10, 000. 00	March 3, 1905 .....	2, 000. 00
June 14, 1880 .....	5, 000. 00		<hr/>
March 3, 1881.....	5, 000. 00	Total .....	101, 000. 00
August 2, 1882 .....	6, 000. 00	Expended to June 30, 1905..	99, 039. 10
August 5, 1886 .....	2, 000. 00		<hr/>
August 11, 1888 .....	5, 000. 00	Unexpended July 1, 1905.	1, 960. 90
September 19, 1890 .....	3, 000. 00		

NOTE.—The river and harbor act of July 13, 1892, provided “that of the amount one thousand two hundred dollars are to be paid to Charles Roose, of Oak Harbor, Ohio, in full satisfaction for the necessary portion of the sand beach adjoining the inner end of the west revetment of Port Clinton Harbor.”



COMMERCIAL STATISTICS.

The following statistics for the year 1904 relative to the commerce of the harbor of Port Clinton, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts:	Tons.	Receipts—Continued.	Tons.
Cedar Posts .....	1,920	Poles, pound .....	68
Coal .....	29	Wood .....	218
Fish .....	1,800		
Lumber .....	2,500	Total .....	6,535

Shipments: None.

Total freight tonnage:	
1904 .....	6,535
1903 .....	6,649
Decrease .....	114

Vessels—	Number.	Tonnage.
Entering .....	36	3,316
Departing .....	37	3,336

Total registered tonnage:	
1904 .....	6,652
1903 .....	10,575
Decrease .....	3,923

Draft of largest vessels using harbor, 14 feet.  
Largest vessels do not load to full depth.  
No new vessel lines established during the year.

P P 3.

IMPROVEMENT OF SANDUSKY HARBOR, OHIO.

At the beginning of the fiscal year a contract was in force with John J. Stang, of Lorain, Ohio, for dredging in the channel. His contract involved the removal both of earth and of rock in place. His prices had been good for the removal of the earth, but unduly low for the rock. In the previous year he had completed the earth work, involving the removal of 411,733 cubic yards of material. There remained 5,403 cubic yards of rock in place to be removed to complete his contract.

The contract as a whole should have been a profitable one. The rock could hardly be removed without loss. The time of completing his contract has been extended, but he accomplished nothing during the entire working season except to equip a dredge with steam drills to enable him to carry on the work. At the end of the fiscal year he was upon the ground and seemed about to begin the rock excavation.

It is very desirable that this rock work should be done. The act of Congress of March 3, 1905, forbade any further excavation of rock from the channel, and there is a distance along the dock front of about 2,000 feet where a depth of water of 21 feet can not be obtained without removing rock in place. The completion of this contract will afford a channel 60 feet wide through this rock at the shoreward edge of the proposed 300-foot cut. It is possible that the rock dips in

going outward from the shore and that the full depth of 21 feet will be obtained at the outside of the channel. The citizens of Sandusky are greatly interested in securing the full depth in this channel and have recently voted an issue of bonds to enable the work to be done by the city.

Now that the continuous contract is authorized for the completion of the improvement, it is proposed first to completely excavate the channel to the full dimensions in order to ascertain if it will be more economical and advantageous to maintain it by periodical dredging than to attempt to protect and control it by jetties, dikes, and sills. A contract has been let with the Great Lakes Dredge and Dock Company, of Chicago, Ill., which provides for the excavation of 2,004,000 cubic yards of material which will complete the straight channel and the dock channel. It is proposed to dredge the channel on the bar with the Government dredge *Burton*, as this machine is able to work in rough weather and can undoubtedly do the work for a less price than it can be let by contract. The prices secured for the work in the other channels were favorable and less than the estimate. The Great Lakes Dredge and Dock Company have one fine machine on the work and in the last ten days in June it removed 31,301 cubic yards of material.

The following is a tabular statement of expenditures made on account of improving harbor at Sandusky City, Ohio, during the fiscal year 1905:

General administration:

Office and engineering.....	\$246. 07	
Examinations and surveys .....	595. 40	
Travel and miscellaneous .....	38. 55	
Job printing .....	55. 94	
Purchase and repair of plant.....	15. 30	
		\$950. 26

Dredging, Government dredge *Maumee*:

Services .....	113. 16	
Repairs.....	210. 87	
Subsistence .....	6. 33	
Supplies .....	108. 96	
		439. 32

Inspection of dredging (Great Lakes Dredge and Dock Company) .....	67. 50
--	--------

Total ..... 1,458. 08

The following is a tabular statement of expenditures made on account of emergencies in river and harbor works, "Sandusky Harbor, Ohio":

General administration:

Office and engineering .....	\$211. 43	
Examinations and surveys .....	473. 86	
Travel and miscellaneous .....	37. 26	
		\$722. 55

Dredging (Detroit Dredging Company):

Paid to Detroit Dredging Company .....	4,232. 64	
Inspection .....	130. 00	
		4,362. 64

Dredging (Government dredge *Maumee*):

Services .....	2,207. 95	
Subsistence .....	637. 86	
Repairs.....	458. 43	
Towing .....	80. 00	
Supplies .....	1,530. 57	
		4,914. 81

Total ..... 10,000. 00

For a detailed account of the operations at this harbor attention is respectfully invited to the report of Assistant Engineer William T. Blunt, which is transmitted herewith. Mr. Blunt includes in his report, in a very concise form, some valuable results of triangulation in Sandusky Harbor, and it is respectfully recommended that these be published, as they have more than a local interest.

An appropriation of \$185,000 is recommended for this harbor, of which \$175,000 is from the authorization of the river and harbor act of March 3, 1905, and will be used for continuing the improvement in accordance with the approved project, and \$10,000 is for the maintenance of improvement and will be used for repairing and maintaining the permanent works and also for maintaining depths in the channel.

*Money statement.*

July 1, 1904, balance unexpended .....	\$23,659.88
Amount appropriated by river and harbor act approved March 3, 1905..	125,000.00
	<hr/>
	148,659.88
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	11,458.08
	<hr/>
July 1, 1905, balance unexpended .....	137,201.80
July 1, 1905, outstanding liabilities .....	200.00
	<hr/>
July 1, 1905, balance available .....	137,001.80
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	10,653.58
	<hr/>
Amount (estimated) required for completion of existing project .....	480,000.00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement.....	\$175,000.00
For maintenance of improvement .....	10,000.00
	<hr/>
	185,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

AMOUNT AND DATE OF ALL APPROPRIATIONS.

June 11, 1844.....	\$15,000.00	August 5, 1886 .....	\$5,000.00
August 30, 1852 .....	15,000.00	August 11, 1888 .....	40,000.00
June 28, 1864 (allotment)...	10,000.00	September 19, 1890 .....	45,000.00
June 23, 1866 .....	38,580.00	July 13, 1892.....	41,712.00
June 11, 1870 .....	10,000.00	August 18, 1894 .....	30,000.00
June 10, 1872 .....	13,000.00	June 3, 1896.....	40,000.00
March 3, 1873 .....	25,000.00	March 3, 1899.....	80,000.00
June 23, 1874 .....	25,000.00	June 13, 1902 .....	125,000.00
March 3, 1875 .....	25,000.00	April 28, 1904 (allotment) ..	10,000.00
August 14, 1876 .....	25,000.00	March 3, 1905.....	125,000.00
June 18, 1878 .....	20,000.00		<hr/>
March 3, 1879 .....	1,000.00	Total .....	816,792.00
July 14, 1880 .....	12,500.00	Expended to June 30, 1905..	679,590.20
March 3, 1881 .....	10,000.00		<hr/>
August 2, 1882 .....	10,000.00	Unexpended July 1,	
July 5, 1884.....	20,000.00	1905 .....	137,201.80

CONTRACT IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

*Contract for dredging at Sandusky Harbor, Ohio.*

Name of contractor: John J. Stang, Lorain, Ohio.  
 Date of contract: September 27, 1902.  
 Date of approval: October 18, 1902.  
 Date of commencement: November 14, 1902.  
 Date of completion: November 20, 1903. (Extended to include working season of 1904; extended to include working season of 1905.)

## COMMERCIAL STATISTICS.

The following statistics for the year 1904, relative to the commerce of the harbor of Sandusky, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Fish.....	2,204	Coal.....	708,868
Grain.....	15,000	Merchandise, miscellaneous.....	40,550
Iron ore.....	40,679	Sand.....	44,392
Iron, pig.....	17,686	Stone.....	334,000
Lumber.....	57,251		
Merchandise, miscellaneous.....	20,800		
Plaster.....	850		
Pulp wood.....	8,080		
Salt.....	7,450		
Sand.....	127,608		
Stone.....	16,197		
Total.....	308,805	Total.....	1,127,810

## Total freight tonnage:

1904..... 1,436,615  
 1903..... 1,473,740

Decrease..... 37,125

Vessels.	Number.	Tonnage.
Entering.....	4,479	1,164,924
Departing.....	4,485	1,165,179

## Total registered tonnage:

1904..... 2,330,103  
 1903..... 1,589,900

Increase..... 740,203

Draft of largest vessels using harbor, 20 feet.

Largest vessels do not load to full depth.

No new vessel lines established during the year.

## REPORT OF MR. WILLIAM T. BLUNT, ASSISTANT ENGINEER.

TOLEDO, OHIO, July 1, 1905.

COLONEL: I have the honor to submit the following report upon Sandusky Harbor, Ohio, for the fiscal year ending June 30, 1905:

All depths mentioned are given at mean level of Lake Erie, 1860-1875, the surface being now about 0.3 foot above that level.

*Dredging.*—The rock dredging under contract of John J. Stang, dated September

27, 1902, had not been begun at the end of the fiscal year, but it seems now certain that it will be entered upon within a few days.

Under an emergency appropriation of \$10,000 the U. S. dredge *Maumee* worked in the Straight channel and East Dock channel August 5 to October 4, removing 42,609 cubic yards from the Straight channel and 8,320 cubic yards from the East Dock channel; and the Detroit Dredging Company dredge *No. 2* worked on the West Dock channel October 6 to November 12, removing 27,217 cubic yards.

Under provisions of the river and harbor act of March 3, 1905, a contract was entered into with the Great Lakes Dredge and Dock Company, of Chicago, Ill., for the completion of the dredging necessary to obtain a channel 21 feet deep, 400 feet wide from Cedar Point to the Baltimore and Ohio wharves (Straight channel) and 300 feet wide, thence up to the "Short Line" wharves now operated by the Pennsylvania Company (Dock channel). Under special permission the contractor was allowed to begin work before the contract was signed. Its dredge *No. 3* began work at outer end of Straight channel June 20, and while it is a very large and effective machine, it has been working with small scow capacity and not attempting rapid work. Up to June 30 this dredge had removed 31,301 cubic yards.

Summary of work under 21-foot project of 1900.

	Previously reported.	Fiscal year ending June 30, 1905.		
		U. S. dredge <i>Maumee</i> .	Detroit dredge <i>No. 2</i> .	Great Lakes Dredge and Dock Co.'s dredge <i>No. 3</i> .
	<i>Cubic yds.</i>	<i>Cubic yds.</i>	<i>Cubic yds.</i>	<i>Cubic yds.</i>
Outer bar .....	180, 134	.....	.....	.....
Straight channel.....	210, 650	42, 609	.....	31, 301
East Dock channel .....	55, 443	8, 320	.....	.....
West Dock channel.....	15, 506	.....	27, 217	.....
Total.....	411, 733	50, 929	27, 217	31, 301

	Cubic yards.
Total removed from all channels under 21-foot project previous to contract of the Great Lakes Dredge and Dock Company.....	489, 879
Of which there came from the West Dock channel.....	42, 723
Total from channels to be finally improved .....	447, 156

It should be explained that the West Dock channel will now be made on the straight continuation of the Main or East Dock channel. Heretofore funds have been insufficient to do any conclusive work upon the new line, and such work as was done was on the old cut bending southerly from the main channel.

*Condition of channels.*—There has been no opportunity to carefully examine the channels this spring, but such casual knowledge as can be gained indicates that the 21-foot channel is holding well, both in depth and width. Vessels of the deepest draft which can pass the rivers have no difficulty in reaching the Baltimore and Ohio wharves, while up to the Pennsylvania wharves the depth is still limited by the ridge of rock to be partially removed under the Stang contract.

*Condition of permanent work.*—All the jetties, bank protections, etc., are in excellent condition, except that the submerged dam extending westward 1,000 feet from the Straight Channel front light has been badly torn apart and spread.

TRIANGULATION OF SANDUSKY HARBOR.

At various times since 1892 the work of triangulating this harbor has been accomplished as time allowed or necessity called for. The results have now been computed and tabulated, and are believed to be of such accuracy as to justify their publication for reference and preservation. All work was done with Buff & Berger transit No. 743, reading to 30 seconds, and by estimation easily to 15 seconds, on a 6½-inch circle, by 2 verniers. The repetition method was used, as being best adapted to the existing conditions, great care being taken to eliminate constant errors, but owing to the work being spread over so many years and carried on in such a desultory manner,

the results are not up to the standard of 3-second work, which was intended. Average closure of triangles was about 4 seconds.

A base line was measured on Johnson Island with a Chesterman steel tape, whose length had been determined by comparison with the Mississippi River Commission standard. After correction for temperature, inclination, and sea level, the two measurements were 3,274.304 and 3,274.292 feet; mean, 3,274.298 feet. The old value of meter has been used in reduction, viz, 3.28087; logarithm, 0.5159889.

The light-houses at Cedar Point, Straight Channel front, and rear outer were occupied in eccentric positions and used in the net, while the two rear lights of the ranges were not occupied.

The azimuth, east base to west base, as given in United States Lake Survey Report, 1902, was used in the reduction. As west base could not be seen from east base, the angle, steeple to west base, as given in Professional Papers, No. 24, was used, and angles were read at east base and boulder to connect with the work.

The only points in this work which are given in the Lake Survey Report, 1902, are Sandusky court-house (clock tower) and Cedar Point light-house, whose positions are named to hundredths of seconds. From these two, and lengths computed from Johnson Island base, the position of crib was computed, with close agreement. Taking the mean value of crib L. and M. to third decimal, and applying the corrections backward, values of L. and M. for clock tower and Cedar Point light-house were obtained to third place, and these were used in the computation, as they agree in second place with the published record.

For check on the work, it is found that inverse computation of azimuth—clock tower to Straight Channel front agrees within 1 second with the azimuth at Straight Channel front as computed from direct observation; also that the distance, clock tower to Cedar Point light-house, as computed from Johnson Island base, fulfills the adopted positions in third decimal.

A sketch <sup>a</sup> on tracing cloth accompanies this report, upon which are shown the relative positions of triangulation points herein described. The results of the work are given in the following table, and the computations in detail are on file, bound together for preservation:

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<sup>a</sup> Not printed.

## SANDUSKY HARBOR, OHIO.

Table of positions, azimuths, and lengths.

Station.	Latitude and longitude.		Seconds, in meters.		Azimuth.		To station.	Distance.		Logarithm.
	°	'	°	'	°	'		Feet.	Feet.	
Clock tower.....	41 27 13.638	420.7	1,430.8	21 26 49.1	Clock tower.....			12,434.42	41262186	
Cedar Point light-house.....	42 42 41.048	952.8	1,439.9	267 44 56.8	Cedar Point light-house.....			6,598.36	38194363	
Main crib light.....	41 29 17.182	530.1	1,320.9	352 10 08.8	Clock tower.....			12,361.66	40920776	
Boulder.....	42 41 36.642	947.7	1,399.6	191 58 59.3	Cedar Point light-house.....			10,379.08	40161668	
	41 29 14.631	451.4	1,318.4	155 50 28.9	Crib.....			10,844.75	40362196	
	42 43 03.170	73.5	1,713.4	165 50 28.9	Cedar Point light-house.....			8,076.18	39071495	
	41 27 36.674	1,187.5	1,279.6	800 51 37.1	Main crib light.....			4,414.86	38446994	
	42 42 04.856	112.7	1,279.6	355 36 03.1	Crib.....			5,998.38	37780803	
	41 29 58.116	1,792.9	58.1	77 14 51.4	Sand Point.....			6,910.83	38396300	
	42 43 07.618	176.7	1,214.9	116 26 33.5	Clock tower.....			14,196.83	41521761	
	41 29 27.720	865.2	995.8	17 04 36.2	Crib.....			6,894.02	38378419	
	42 41 46.304	1,074.1	317.7	66 11 13.0	Sand Point.....			6,830.71	38344656	
	41 29 42.100	1,238.6	552.2	103 44 12.0	Crib.....			8,986.42	35961459	
	42 41 40.422	937.6	454.1	94 53 41.9	Sand Point.....			6,871.23	38042280	
	41 29 11.316	349.1	1,501.9	136 02 06.7	Crib.....			2,483.76	33915980	
	42 42 11.635	269.9	1,122.1	136 34 11.0	Front, outer.....			2,618.66	34180797	
	41 26 57.250	1,786.2	84.8	237 03 47.0	Sand Point.....			2,859.51	34562918	
	42 42 40.508	989.8	452.2	276 19 16.6	Crib.....			5,650.56	37520980	
	41 30 00.738	22.8	1,828.2	325 40 28.6	North base.....			3,274.30	35151182	
	42 43 45.094	1,044.5	947.1	207 19 22.1	Crib.....			5,007.96	36996624	
	41 29 31.906	987.1	863.9	290 32 33.5	Cedar Point light-house.....			11,381.04	40563049	
	42 44 04.794	111.0	1,280.8	277 33 28.1	South base.....			14,606.77	41646186	
	41 27 07.902	243.8	1,607.2	176 43 29.0	Cedar Point light-house.....			16,746.50	42239240	
	42 43 58.817	1,249.2	145.5	218 36 04.2						



## DESCRIPTION OF STATIONS.

*Clock tower.*—Sandusky court-house, 1877, as described in Professional Papers, No. 24. Its tower was burned in 1891, and was rebuilt upon the same base. Point used was the center of the extreme top roof, 9 by 7 feet. The clock tower is on the prolongation of the Straight channel, and its four clock faces are lighted at night.

*Boulder.*—Near easterly end of Water street, on large riprap stone protecting track of the Lake Shore and Michigan Southern Railway on its curve and 30 feet from track. Stone shows just above surface of fill, and point is marked by a copper plug set in 1-inch hole. Ranges to buildings are given in sketch on file.

*Cedar Point light-house.*—Point for observation was base of spindle where it entered ball over center of lantern. Eccentric point was on platform outside of lantern nearly on line to crib. Tower was torn down in 1904.

*Main Crib light.*—Point was center of lantern located on corner of fence around platform at top of stairway leading to elevated house. Entire structure was destroyed after the observations were taken.

*Sand Point.*—Marked by a stake set in sand near shore of Sand Point projecting southerly from Marblehead. It was washed away soon after the observation of 1898, which was taken with the instrument standing in water.

*North base.*—On easterly prolongation of southerly fence around Confederate cemetery, north end of Johnson Island, 109.05 feet from corner of fence, which consists of iron posts and twisted wire, 30.5 feet westerly from basswood tree standing alone. Marked by a 1½-inch square iron rod, 18 inches long, with a quarter-inch hole one-half inch deep, and "U. S." punched on top.

*South base.*—On edge of bank of old stone quarry, 600 feet south from hedge road leading up from main landing to old barracks. Destroyed by opening of quarry in 1903.

*Straight Channel front.*—Front Range light for Straight channel on dwelling, on bar opposite Cedar Point. Base of spindle where it enters ball over center of lantern. Eccentric station is a cross cut on solder of copper covered platform at first joint from southwest corner post, and on ridge. Measurements on sketch.

*Front outer.*—Front Range light for outer range, on dwelling, on middle ground. Base of spindle where it enters ball over center of lantern. Eccentric station is a cross on copper covered platform outside of lantern, in front of door. Measurements on sketch.

*Short line.*—On northwest corner of "Short Line" (now Pennsylvania) coal wharf, 28.90 feet from north end of wharf, and 18.39 feet from west face, 4.90 feet west of snubbing post. Marked by a 1½-inch square iron rod, 24 inches long, with a quarter-inch hole, one-half inch deep, and "U. S." punched on top.

Very respectfully,

WM. T. BLUNT,  
United States Assistant Engineer.

Lieut. Col. DAN C. KINGMAN,  
Corps of Engineers.

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 P P 4.

## IMPROVEMENT OF HURON HARBOR, OHIO.

A description of the early conditions of the harbor at the mouth of Huron River and of the projects for its improvement is given on pages 2653 and 2654, Report of Chief of Engineers, 1898.

The present project is authorized by the river and harbor act of March 3, 1905, and is given in full in the Report of Chief of Engineers, 1894, pages 3209 to 3218, inclusive.

In the spring of 1904 an allotment of \$40,000 was made from the river and harbor appropriation of that year for the purpose of maintaining this harbor. About 500 feet at the inner end of the west jetty was in such a ruinous condition that it was likely to be destroyed by any storm, thus involving the destruction of the channel. The funds have been expended during the year in the construction of about 490 linear feet of timber-crib jetty with a timber superstructure. The



cribs were built and sunk in place before the close of the working season of 1904, and although the superstructure was not completed over them they were high enough to thoroughly protect the channel. The superstructure is now being built by hired labor. The 490 feet of structure was not quite sufficient to run to the shore. It left a gap of about 70 feet through which the sea worked, causing the shore line to recede. This was temporarily checked by a mattress of timber, brush, and stone. The gap is now being closed by a coffer of two rows of 12 by 12 tongued and grooved sheet piling driven in prolongation of the crib walls and tied together and braced by 4-pile trestle bents placed 8 feet apart to conform to the ordinary cross walls of a crib. This coffer will be filled with stone and a superstructure built upon it, so that it will resemble the rest of the work. It is of such a character that it can carry a concrete superstructure whenever this style of top is placed upon the other portion of the jetty.

The river and harbor act of March 3, 1905, appropriated \$68,500 for this harbor, and authorized contracts to the amount of \$200,000 more. The funds available will be applied to the extension of the west jetty 240 feet and to building the two pierheads. The cribwork will be built and sunk by hired labor. Arrangements are now being made to purchase the material. Proposals will be invited for the execution of the rest of the work by contract when the proper time arrives.

The following is a tabular statement of expenditures made on account of "Emergencies in River and Harbor Works," "Huron, Harbor, Ohio," during the fiscal year 1905:

General administration:	
Office and engineering.....	\$510. 00
Examinations and surveys.....	845. 50
Purchase and repair of plant.....	549. 49
Travel and miscellaneous.....	138. 59
	<hr/> \$2, 043. 58
Repair of piers:	
Materials.....	23, 608. 99
Services.....	8, 752. 69
Towing.....	134. 63
Dredging trench (Government dredge <i>Maumee</i> )—	
Services.....	3, 626. 79
Repairs.....	468. 52
Supplies.....	927. 01
Subsistence.....	437. 79
	<hr/> 37, 956. 42
Total.....	<hr/> 40, 000. 00

The following is a tabular statement of expenditures made on account of improving harbor at Huron, Ohio, during the fiscal year 1905:

General administration:	
Office and engineering.....	\$37. 50
Examinations and surveys.....	189. 41
Purchase and repair of plant.....	30. 92
Travel and miscellaneous.....	18. 35
	<hr/> \$276. 18
Repair of pier:	
Materials.....	180. 52
Services.....	28. 89
	<hr/> 209. 41
Total.....	<hr/> 485. 59

For a detailed account of the work, which has been done during the present year at this harbor, attention is respectfully invited to the report of Assistant Engineer Wm. T. Blunt, which is transmitted herewith.

An appropriation of \$200,000 is recommended for this harbor under the authorization of 1905, and will be used for completing the improvement contemplated in the adopted project.

*Money statement.*

July 1, 1904, balance unexpended .....	\$47,850.35
Proceeds from sale of Government property .....	25.00
Amount appropriated by river and harbor act approved March 3, 1905..	68,500.00
	<hr/>
	116,375.35
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	40,485.59
	<hr/>
July 1, 1905, balance unexpended .....	75,889.76
July 1, 1905, outstanding liabilities .....	3,277.42
	<hr/>
July 1, 1905, balance available .....	72,612.34
	<hr/>
Amount (estimated) required for completion of existing project .....	200,000.00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	200,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

AMOUNT AND DATE OF ALL APPROPRIATIONS.

May 20, 1826.....	\$5,000.00	August 5, 1886 .....	\$3,000.00.
May 19, 1828.....	4,413.35	August 11, 1888 .....	6,000.00
March 3, 1829.....	5,935.00	September 19, 1890 .....	16,000.00
April 23, 1830 .....	1,880.36	July 13, 1892.....	15,000.00
March 2, 1831.....	3,480.00	August 18, 1894 .....	10,000.00
July 3, 1832.....	1,500.00	June 3, 1896 .....	8,000.00
June 28, 1834 .....	6,700.00	March 3, 1899.....	25,000.00
June 2, 1836 .....	4,300.00	June 13, 1902 .....	40,000.00
March 3, 1837 .....	2,565.00	April 28, 1904 (allotment) ..	40,000.00
July 7, 1838.....	5,000.00	February 11, 1905 (proceeds of sale of Government property) .....	25.00
June 11, 1844 .....	5,000.00	March 3, 1905.....	68,500.00
August 30, 1852 .....	10,000.00		<hr/>
June 23, 1866 .....	39,000.00	Total .....	345,798.71
June 23, 1874 .....	1,500.00	Expended to June 30, 1905..	269,908.95
March 3, 1875 .....	1,000.00		<hr/>
June 18, 1878 .....	1,000.00	Unexpended July 1, 1905 .....	75,889.76
June 14, 1880 .....	3,000.00		
March 3, 1881.....	3,000.00		
August 2, 1882.....	2,500.00		
July 5, 1884.....	7,500.00		

2326 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

COMMERCIAL STATISTICS.

The following statistics for the year 1904 relative to the commerce of the harbor of Huron, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Fish.....	200	Coal .....	259,013
Iron ore.....	231,364		
Lumber.....	1,231		
Pier stone.....	6,602		
Pulp wood .....	4,438		
Total.....	243,835	Total .....	259,013

Total freight tonnage:	
1904.....	502,848
1903.....	701,385
Decrease.....	198,537

Vessels—	Number.	Tonnage.
Entering.....	260	187,801
Departing.....	255	188,267

Total registered tonnage:	
1904.....	376,068
1903.....	616,775
Decrease.....	240,707

Draft of largest vessels using harbor, 20 feet.  
Largest vessels do not load to full depth.  
No new vessel lines established during the year

REPORT OF MR. WILLIAM T. BLUNT, ASSISTANT ENGINEER.

TOLEDO, OHIO, July 1, 1905.

COLONEL: I have the honor to submit the following report upon Huron Harbor, Ohio, for the fiscal year ending June 30, 1905:

All depths mentioned are given at mean level of Lake Erie, 1860-1875, surface being now about 0.3 foot above that level.

At the beginning of the fiscal year there had been ordered about 770,000 feet of timber and 110 tons of iron to be used in the construction of about 500 feet of west pier, to connect as closely as possible with the shore, under an emergency appropriation of \$40,000, the work to be done by day labor.

The delivery of material began July 12, and was completed September 27. As soon as sufficient material was on hand the construction of cribs was begun in lengths of 122 feet 8 inches, as heretofore, each having 15 pockets, 8 feet on centers. Numerous delays were met, owing to nondelivery of material, strikes at stone quarry, etc., but on the whole the construction and sinking of the four cribs was done with considerable expedition, as shown in the following table:

Crib.	Begun.	Launched.	Com- pleted.	Sunk.
No. 6.....	July 25	Sept. 10	Oct. 8	Nov. 2
No. 7.....	Sept. 13	Oct. 8	Oct. 22	Nov. 4
No. 8.....	Oct. 10	Oct. 29	Nov. 10	Nov. 12
No. 9.....	Nov. 3	Nov. 24	Nov. 30	Dec. 5

The removal of old pier and preparation of trench was done by U. S. dredge *Maumee*, beginning October 7. The dredge was held to assist in setting crib No. 9, December 5, and had some trouble in returning to Toledo for winter quarters, owing to the formation of ice.

During and after the sinking of cribs there was considerable heavy weather from the westward, which threw them somewhat out of alignment, especially at the outer end of crib No. 6, where an angle in the line was made. At this point No. 6 was thrown about 2 feet into the river, necessitating a special construction for its protection. Work on superstructure was postponed until spring, and up to June 30 the walls have been built to grade, but decking is not yet on.

These cribs carried the pier close to the old pile protection along the shore, but in dredging the bed the pile protection was destroyed, so that a gap existed about 60 feet wide. During the winter the seas washed through and attacked the shore, so that it became necessary to protect it by a rough mattress loaded with timber, logs, stone, etc. The cutting was thus checked, but the gap to be closed had become 80 feet wide. By your direction this is being closed by a pile structure. Round piles are first driven in four-pile bents 8 feet apart along the axis, all within the exterior lines of the pier. These serve first as a trestle for support of driver and then as a base for cross walls. Along the exterior lines of pier will be driven sheet piling of 12 by 12 inch timber with 3 by 4 inch pieces planted on to form tongue and groove. The cross walls will be built up with corner posts and braces, and the interior filled with stone. On June 30 there had been driven 28 round piles, under informal agreement with John J. Stang, for driving, the material having been purchased in the open market.

Under the provision of the river and harbor act of March 3, 1905, specifications were issued June 27 for furnishing at Huron Harbor about 656,000 feet of timber and 103 tons of iron for use in building the west pier extension and the two pier-heads by day labor.

Soundings taken by Inspector Simpson in the spring of 1905 indicated a general depth of 20 feet and upward outside the piers and a good channel exceeding 21 feet between the piers throughout.

Very respectfully,

Lieut. Col. DAN C. KINGMAN,  
*Corps of Engineers.*

WM. T. BLUNT,  
*United States Assistant Engineer.*

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## P P 5.

### IMPROVEMENT OF VERMILION HARBOR, OHIO.

For a description and history of this improvement see page 2696, Report of Chief of Engineers, 1898.

No funds were available for the improvement of this harbor at the beginning of the fiscal year 1905. An examination and survey had been made under authority of the river and harbor act of June 13, 1902, and a plan of improvement based upon a survey had been submitted. This plan was adopted by Congress in the act of March 3, 1905.

The only object proposed under this plan is to repair the existing jetties in a durable and permanent manner. The superstructures will be removed to the level of the water surface, side walls will be reenforced by heavy riprap having slopes of 1 on 1½. These slopes will be continued above the surface of the water, so as to give the jetties a height of 5 feet. The stone will be of sufficient size so as not to be disturbed by waves, ice, or currents; and above water the large stones will be regularly laid in the form of a pavement. The estimated cost of this work is \$42,350.

The act of Congress last above referred to appropriated \$15,000 for carrying on the work. Plans and specifications have been prepared, proposals invited, and a contract let to provide for the expenditure of

this money. This work was combined in one contract with the proposed work at Port Clinton. The Buckeye Contracting Company, of Cleveland, Ohio, was the successful bidder. The work will be begun at the inner end of the west jetty and continued outward as far as the funds available will permit. In this way the portion of the jetty most in need of repair will receive the first attention. It is thought that the funds will permit all of the very bad part to be covered.

Money statement.

Amount appropriated by river and harbor act approved March 3, 1905.	\$15,000.00
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	33.19
July 1, 1905, balance unexpended .....	14,966.81
July 1, 1905, outstanding liabilities .....	100.00
July 1, 1905, balance available .....	14,866.81
Amount (estimated) required for completion of existing project .....	27,350.00
Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	27,350.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

AMOUNT AND DATE OF ALL APPROPRIATIONS.

July 2, 1836 .....	\$10,000.00	August 11, 1888 .....	\$1,000.00
March 3, 1837 .....	20,000.00	September 19, 1890 .....	2,000.00
July 7, 1838 .....	23,626.57	July 13, 1892 .....	2,000.00
June 28, 1864 (allotment)....	5,758.97	June 3, 1896 .....	1,000.00
June 23, 1866 .....	13,315.74	August 18, 1894 .....	2,000.00
June 10, 1872 .....	5,000.00	June 6, 1900 (allotment)....	176.27
March 3, 1873 .....	12,000.00	August 5, 1902 (allotment)...	400.00
June 23, 1874 .....	3,000.00	March 3, 1905 .....	15,000.00
March 3, 1875 .....	10,000.00		
August 14, 1876 .....	5,000.00	Total .....	148,277.55
June 18, 1878 .....	4,000.00	Expended to June 30, 1905 ..	133,310.74
June 14, 1880 .....	2,000.00		
March 3, 1881 .....	2,000.00	Unexpended July 1,	
August 2, 1882 .....	3,000.00	1905 .....	14,966.81
August 5, 1886 .....	3,000.00		

COMMERCIAL STATISTICS.

The following statistics for the year 1904, relative to the commerce of the harbor of Vermilion, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Fish.....	1,000	Fish .....	1,000
Shingles .....	150	Lumber .....	500
		Poles .....	250
		Sand .....	2,000
Total.....	1,150	Total .....	3,750

Total freight tonnage:	
1904.....	4,900
1903.....	1,500
Increase .....	3,400

Vessels.	Number.	Tonnage.
Entering.....	220	3,752
Departing.....	226	3,821

Total registered tonnage:	
1904.....	7,573
1903.....	7,060
Increase .....	513

Draft of largest vessels using harbor, 12 feet.  
Largest vessels do not load to full depth.  
No new vessel lines established during the year.

## P P 6.

### IMPROVEMENT OF BLACK RIVER (LORAIN) HARBOR, OHIO.

A description of the location, conditions, and projects for improvement of this harbor is given on page 2658 of the Report of the Chief of Engineers for 1898.

The execution of the approved project, as far as the means available would allow, is now being carried out under a continuous contract with Patrick Keohane, of Fayetteville, N. Y., dated October 27, 1900, and modified by a supplementary agreement which provides for widening the jettied channel to 300 feet.

At the beginning of the fiscal year operations were in progress for rebuilding the jetties, and constructing two pierheads and the west breakwater. The work upon the jetties has been completed. Small and unsatisfactory progress has been made upon the west breakwater, and it is evident that it will not be completed in the contract time. The contractor built one timber-crib pierhead and undertook to sink it upon a prepared foundation at the outer extremity of the west breakwater late in November, 1904. His force was driven away by a storm before the crib could be filled with stone, and as a result it was shifted from its position and left resting only in part upon the foundation. It was necessary to reject it and to require the contractor either to demolish it or to raise and repair it. He has selected the latter alternative and is now engaged in dredging out the stone from the pockets.

A contract was let in August, 1904, for constructing the east breakwater as far as the means available would allow. A large amount of work had already been done upon this structure, practically without cost to the United States, by permitting the city of Lorain to deposit, under proper supervision, shale rock dredged from the river along the axial line of the proposed breakwater. The amount of money probably available under the authorization of 1899 will not be sufficient to complete the entire east breakwater, but an allotment has been made from the funds appropriated by the act of March 3, 1905, to complete



it. In addition, it is proposed to repair by a concrete superstructure 645 linear feet of the west jetty. This will make the structure uniform throughout. The work has been let to the Buckeye Contracting Company, of Cleveland, Ohio.

At the close of the fiscal year 1904 the U. S. dredge *Maumee* was at work excavating the channel between the jetties, which had been obstructed by a freshet in the previous winter. It continued the work until the 12th of July, having removed in the aggregate 16,862 cubic yards of material at a field cost of \$2,210.38.

The following is a statement of expenditures for improving harbor at Black River (Lorain), Ohio, during the fiscal year 1905:

General administration:

Physical observations.....	\$110. 00	
Office and engineering .....	1, 807. 00	
Travel and miscellaneous .....	148. 11	
Purchase and repair of plant .....	720. 99	
Examinations and surveys .....	478. 07	
Printing and advertising .....	139. 21	
		\$3, 403. 38

Construction, breakwaters and piers:

Contractor (on contract of 1900).....	69, 274. 29	
Contractor (on contract of 1904).....	18, 020. 21	
Inspection .....	4, 646. 12	
		91, 940. 62

Dredging (Government dredge *Maumee*):

Services.....	1, 070. 50	
Repairs .....	57. 52	
Supplies .....	432. 29	
Subsistence .....	209. 20	
		1, 769. 51

Construction of shore protection:

Services.....	506. 99	
Materials .....	257. 62	
		764. 61

For a detailed description of the work done during the present year, and for tabular statements of material and cost, attention is respectfully invited to the report of Assistant Engineer G. T. Nelles, which is transmitted herewith.

An appropriation of \$91,000 is recommended for this harbor, of which \$66,000 is the balance of continuous contract money authorized by the act of March 3, 1899, and will be used in continuing the work under this project. Twenty-five thousand dollars is for maintenance of improvement, and will be used in maintaining the depths in the channel and sheltered areas and in the repair of the permanent works.

*Money statement.*

July 1, 1904, balance unexpended .....	\$338, 422. 49
Amount appropriated by river and harbor act approved March 3, 1905. ....	85, 000. 00
Amount appropriated by sundry civil act approved March 3, 1905 .....	20, 000. 00
Proceeds from salvage of property .....	32. 50
	443, 454. 99
June 30, 1905, amount expended during fiscal year.....	
For works of improvement.....	\$95, 212. 38
For maintenance of improvement .....	3, 644. 85
	98, 857. 23
July 1, 1905, balance unexpended .....	344, 597. 76
July 1, 1905, outstanding liabilities .....	8, 891. 73
July 1, 1905, balance available .....	335, 706. 03



July 1, 1905, amount covered by uncompleted contracts.....	\$291,776.95
Amount (estimated) required for completion of existing project....	151,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement .....	\$66,000.00
For maintenance of improvement .....	25,000.00
	91,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

AMOUNT AND DATE OF ALL APPROPRIATIONS.

May 23, 1828.....	\$7,500.00	August 5, 1886.....	\$10,000.00
April 23, 1830.....	8,559.77	August 11, 1888.....	10,000.00
March 2, 1831.....	9,275.00	September 19, 1896.....	12,000.00
July 3, 1832.....	8,000.00	July 13, 1892.....	20,000.00
March 2, 1833.....	2,400.00	August 18, 1894.....	10,000.00
June 28, 1834.....	5,000.00	June 3, 1896.....	30,000.00
March 3, 1835.....	4,400.00	March 3, 1899.....	50,000.00
July 2, 1836.....	6,660.00	June 6, 1900.....	125,000.00
March 3, 1837.....	6,410.00	June 13, 1902.....	6,000.00
July 7, 1838.....	5,000.00	June 28, 1902.....	300,000.00
August 30, 1852.....	5,000.00	March 3, 1903.....	9,000.00
June 28, 1864 (allotment)....	20,000.00	April 28, 1904.....	100,000.00
June 23, 1866.....	10,000.00	Redeposited July 20, 1904	
June 10, 1872.....	20,000.00	(salvage of dredge spud)...	32.50
March 3, 1873.....	20,000.00	March 3, 1905.....	85,000.00
June 23, 1874.....	20,000.00	March 3, 1905.....	20,000.00
March 3, 1875.....	10,000.00		
August 14, 1876.....	6,000.00	Total .....	987,237.27
June 18, 1878.....	1,000.00	Expended to June 30, 1905..	642,639.51
June 14, 1880.....	1,000.00		
March 3, 1881.....	7,000.00	Unexpended July 1,	
August 2, 1882.....	7,000.00	1905.....	344,597.76
July 5, 1884.....	10,000.00		

LIST OF CONTRACTS IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

*Contract for constructing west breakwater, two pierheads, removing and rebuilding parts of east and west piers.*

Name of contractor: Patrick Keohane, Fayetteville, N. Y.  
Date of contract: October 27, 1900.  
Date of approval: November 22, 1900.  
Date of commencement: April 1, 1901.  
Date of completion: August 31, 1905.

*Contract for constructing the east breakwater.*

Name of contractor: Patrick Keohane, Fayetteville, N. Y.  
Date of contract: August 18, 1904.  
Date of approval: September 16, 1904.  
Date of commencement: October 10, 1904.  
Date of completion: December 31, 1906.

2332 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

COMMERCIAL STATISTICS.

The following statistics for the year 1904, relative to the commerce of the harbor of Black River (Lorain), Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Fish .....	400	Coal and coke .....	1,083,719
Iron ore.....	1,126,514	Iron and steel .....	14,475
Lumber, logs, etc.....	16,191		
Sand, gravel, and shale.....	114,950		
Shingles .....	140		
Stone .....	34,149		
Railroad ties and posts .....	2,700		
Total.....	1,295,044	Total .....	1,098,194

Total freight tonnage:	
1904 .....	2,393,238
1903 .....	2,368,482
Increase .....	24,756

Vessels.	Number.	Tonnage.
Entering.....	580	679,657
Departing.....	567	669,982
Built.....	3	13,825

Total registered tonnage (vessels entering and departing):	
1903 .....	1,477,204
1904 .....	1,349,639
Decrease .....	127,565

Draft of largest vessels using harbor, 20 feet.  
Largest vessels do not load to full depth.  
No new vessel lines established during the year.

REPORT OF MR. G. T. NELLES, ASSISTANT ENGINEER.

CLEVELAND, OHIO, June 30, 1905.

COLONEL: I have the honor to submit the following report of operations carried on under my local supervision at Lorain Harbor, Ohio, during the fiscal year ending June 30, 1905:

The improvement of this harbor is being made under a project designated as plan "B," in report dated November 1, 1897, which provides for the construction of a small harbor of refuge in the lake at the mouth of the Black River, and the repair and reconstruction of the jetties beyond the shore line. The entrance to the proposed harbor will be between two pierheads about 500 feet apart and 1,850 feet beyond the end of the present west pier. A rubble-mound breakwater 1,800 feet in length, running south from the west pierhead, will form the west side of the harbor, and a breakwater of somewhat similar construction, 1,500 feet in length, running S. 75° E. from the east pierhead, will form the east side. These structures are designed not only to form a harbor, but also to prevent the formation of bars at the mouth of the river, and to make the entrance easier and safer during stormy weather. The total cost of the improvements outlined was limited by the river and harbor act of March 3, 1899, to \$650,000.

The execution of this project is now practically all under contract with Patrick Keohane, of Fayetteville, N. Y., at a total estimated cost, not including inspection and supervision, of \$454,577.40, for the construction of the west breakwater, the two pierheads, forming the new entrance, and the reconstruction of the entire east

pier and part of the west pier, and \$142,782.50 for the construction of the east breakwater.

The river and harbor act of March 3, 1905, provided \$85,000 for completing improvements now under way at Lorain and for maintenance and repair of existing improvements. Part of this sum will be applied to the completion of the original project. The remainder, \$60,000, will be used for dredging and for repairing the old portion (400 feet at inner end and 245 feet at outer end) of the west pier by providing a concrete superstructure similar to that on the new part of this pier and sheathing the substructure cribs with 3-inch hard-wood planks.

A contract for this work has been awarded to the Buckeye Contracting Company, of Cleveland, Ohio, at an estimated cost of \$43,966.75, and preparations are now under way for beginning actual construction as soon as the necessary formalities are completed.

*Pier construction.*—At the beginning of the year 188 linear feet of the concrete superstructure of the east pier remained to be completed. Owing to bad weather and the exposed position of the outer end of this pier the concrete work was not completed until October 18, and even at this time considerable surfacing and repair work was yet to be done and the oak fenders along the harbor face had not yet been placed. This work has since been carried on whenever weather permitted, and was finally completed on June 23.

*Concrete.*—The following is a summary of our records of the concrete operations on these piers, the proportion being 1 cement, 2 sand, 3 gravel, and 4 screened broken stone:

	Concrete blocks.	Concrete in mass.
	<i>Cu. yards.</i>	<i>Cu. yards.</i>
Cement .....	<sup>a</sup> 398	<sup>b</sup> 1,025
Beach sand .....	783	2,021
Broken stone .....	1,566	3,666
Beach gravel .....	1,175	2,749
Total volume of materials .....	3,917	9,461
Total volume of concrete .....	2,590	6,197
Ratio of concrete to materials .....	66.1	66.5
Cement per cubic yard of concrete .....	1.02	1.12

<sup>a</sup> 2,654 barrels.

<sup>b</sup> 6,920 barrels.

*West breakwater.*—Very unsatisfactory progress has been made on this work, nothing at all having been done during the present working season. During last fall, 616.9 tons of small riprap stone, 16,449.6 tons of heavy riprap stone, and 37,748.7 tons of core filling were placed in the work, practically completing the foundation ridges and core filling for 1,600 feet, bringing the work up to an average of 8 feet below mean lake level.

The tabulation herewith relating to this contract shows that, judging from the weight of materials used, 50 per cent of the west breakwater has been completed, while judging from the value of the materials but 40 per cent has been accomplished.

*Pierheads.*—The west pierhead was built up from a height of 5 feet during the year and completed and was sunk in place at the outer end of the west breakwater on November 23. Owing to delay in getting crib in proper position and to difficulty experienced in loading same at night in rough weather but 900 tons, or less than one-half the required amount, of filling stone was placed in the crib. A very severe northwest storm, which commenced during the afternoon of the 23d, while the crib was being loaded, and lasted until the 27th, moved the center of the crib about 15 feet northward, turned it around about 45 degrees to the eastward, throwing the northwest and northeast corners entirely off the prepared foundation.

The contractors were very anxious to have the crib accepted as it stood, and offered to do anything that might be considered necessary to properly support the overhanging corners. At their request it was allowed to stand until this spring, when, after a careful examination and consideration of the whole matter it was decided in view of the importance of this structure as the probable foundation for a fog signal and light-house that it could not be safely accepted until raised and replaced in proper position. After considerable delay the contractors have recently commenced to remove the stone filling from the pockets of the crib with an orange peel bucket, and at the present time have taken out a total of 150 tons. As soon as the crib is sufficiently lightened they propose, by shifting the load on their large 800-ton stone

barges, one of which will be made fast on opposite sides of the crib, to raise and float it into proper position.

The pierhead for the east side of the new harbor entrance has been built up from a height of 6 feet to 14 feet during the year, and as soon as suitable material can be obtained it will be finished and sunk in position without delay.

The character, estimated quantity, and cost of the work to be done under contract with Patrick Keohane, dated October 27, 1900, the character, quantities, and cost of the work done during the year, and the totals to date are as follows:

Item.	Contract price per unit.	Estimated total.		For year.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.
<i>West breakwater.</i>							
Paving.....tons..	\$1.87	27,000.0	\$50,490.00	.....	.....	.....	.....
Small riprap.....do....	.89	74,250.0	66,082.50	616.9	\$549.04	616.9	\$549.04
Heavy riprap.....do....	.90	45,000.0	40,500.00	16,449.6	14,804.64	36,841.6	33,157.44
Core filling.....do....	.70	70,000.0	49,000.00	37,748.7	26,424.09	67,196.7	47,037.69
Total .....			206,072.50	.....	41,777.77	.....	80,744.17
<i>East and west pier reconstruction and pier heads.</i>							
East pier removed, linear feet.....	4.10	1,578.0	6,469.80	.....	.....	1,943.0	7,966.30
West pier removed, linear feet.....	4.10	365.0	1,496.50	.....	.....	.....	.....
Dredging...cubic yards..	.19	125,162.0	23,780.78	.....	.....	125,162.0	23,780.78
Hemlock.....M feet..	22.00	2,639,174.0	58,061.83	.....	.....	2,334,095.0	51,350.09
Oak.....do....	38.00	254,500.0	9,671.00	12,910.0	490.95	219,670.0	8,347.45
Bolts, tie-rods, etc...lbs..	.035	565,600.0	19,796.00	7,141.0	249.95	495,767.0	17,351.86
Lag screws and spikes, pounds.....	.04	267,300.0	10,692.00	.....	.....	233,221.0	9,328.84
Straps.....pounds..	.05	2,390.0	119.50	.....	.....	.....	.....
Concrete blocks, cubic feet.....	.37	81,600.0	30,192.00	7,633.11	2,824.25	69,912.11	25,867.45
Concrete mass, cubic yards.....	7.30	6,950.0	50,735.00	668.23	4,878.08	6,197.23	45,239.78
Filling stone and pier-head foundation.tons..	.89	38,761.79	34,497.99	2,385.6	2,123.18	32,589.79	29,004.91
Heavy riprap for pier-head foundation.tons..	.90	3,120.0	2,808.00	1,439.7	1,295.73	1,439.7	1,295.73
Paving for well.....do....	2.25	82.0	184.50	.....	.....	.....	.....
Total .....			248,504.90	.....	11,862.14	.....	219,533.22
Total cost.....			454,577.40	.....	53,639.91	.....	300,277.39

The contract of Patrick Keohane, dated October 27, 1900, covering the above-described work, provides for the completion of the whole contract by September 1, 1905. The total value of work done and paid for to the end of the present fiscal year is \$300,277.39, which leaves work to the value of \$154,300.01 to be done in two months in order to comply with the contract requirement. This is an evident impossibility, and it is certain that an extension of time will be necessary.

*East breakwater.*—The contract for the construction of the east breakwater, which was entered into on August 3, 1904, with Patrick Keohane, of Fayetteville, N. Y., calls for the construction of a rubble mound breakwater 1,500 feet long, composed of a shale core containing 43 cubic yards per linear foot, covered with a layer of quarry-run stone ranging from 50 pounds to 6 tons in weight, requiring 25.6 tons per linear foot, protected above a depth of 12 feet with a covering of large placed stone ranging from 8 to 12 tons in weight, requiring 38.5 tons per linear foot. The top width, 8 feet above mean lake level, is 10 feet; the lake face and has a slope of 2 to 1 to a depth of 12 feet, and of 1.5 to 1 below this depth; the harbor face has a slope of 1.3 to 1. The estimated cost of the breakwater at contract prices is \$142,782.50.

At the time this contract was let 48,725 cubic yards of shale had been deposited along the center line of the breakwater, and before actual operations were commenced 4,775 cubic yards more had been deposited, making a total of 53,500 cubic yards of shale placed in the breakwater without cost to the Government except for inspection. Of this quantity fully 50,000 cubic yards lie well within the lines of the proposed work, effecting a saving, based on the price paid under contract, of about \$35,000.

Active operations under this contract were begun on October 10, 1904, and 11,123.46 cubic yards of shale-core filling, 15,941.3 tons of quarry-run stone, and 1,692.5 tons of large placed stone have since been used. At the present time the shale-core filling is practically completed, except for a short length at the ends. The quarry-run covering is in place for a length of 500 feet at the outer end, and the large placed stone capping is out of water on the harbor side for a length of about 100 feet.

The following summary shows the character, the estimated quantities, and cost of executing this contract, as well as the character, quantities, and cost of work accomplished during the year:

Item.	Contract price per unit.	Total estimated cost.		Cost for year.	
		Quantity.	Cost.	Quantity.	Cost.
Core filling.....cubic yard..	\$0.70	25,500	\$17,850.00	11,123.46	\$7,786.42
Quarry-run stone.....tons..	1.10	38,500	42,350.00	15,941.3	17,535.43
Large placed stone.....do....	1.43	57,750	82,582.50	1,692.5	2,420.27
Total cost .....			142,782.50		27,742.12

*Dredging.*—The U. S. dredge *Maumee* was working in the jettied channel at the beginning of the year. She completed cleaning up the channel beyond the railway car dump on July 12 and immediately returned to Toledo. During July she excavated 5,330 cubic yards, at a cost of \$804.85, giving a total excavated during her stay at Lorain of 16,862 cubic yards, costing \$2,210.38, or 13.1 cents per cubic yard.

*Shore protection.*—The brush and stone protection work built at the inner end of the east pier, for the purpose of restoring the shore line to its original position, has not proved very efficient. The fill inside of the line of the work, over an area 400 by 600 feet, only amounts to 1,000 cubic yards. Outside of the work there has been no noticeable change, notwithstanding the addition of five short spur dams and the dumping immediately in front of it of nearly 150,000 cubic yards of dredged material from the Black River.

All of the work at Lorain has been carried on under the local supervision of Inspector Alexander J. Savord.

Very respectfully,

G. T. NELLES,  
United States Assistant Engineer.

Lieut. Col. DAN C. KINGMAN,  
Corps of Engineers.

## P P 7.

### IMPROVEMENT OF CLEVELAND HARBOR, OHIO.

For a history of the early conditions and projects of improvement, see pages 2661–2662, Report of the Chief of Engineers for 1898, and pages 530 and 531, Report of the Chief of Engineers for 1899.

At the beginning of the fiscal year the work of renewing the superstructure of the west breakwater was in progress under contract with the Hunkin Brothers, of Cleveland, Ohio. It was continued and the work completed in September, 1904, and was finally inspected and accepted in October of that year. The amount earned by the contractor during the present fiscal year was \$5,774.07, and the total amount paid him under his contract was \$438,725.13.

The work of sheathing the east breakwater with hard-wood plank has been continued during the year and is now nearly completed. It will probably be finished early in August. The amount expended for this work during the year was \$8,649.06, and the total amount expended for this purpose has been \$43,651.88.

The concrete superstructure of the east jetty at the mouth of the Cuyahoga River has been thoroughly repaired and the timber fenders



have been renewed. The concrete superstructure of the west breakwater has received repairs over about one-half of its length and work is in progress over what remains. All of the concrete superstructure in the harbor was protected by horizontal timber fenders of oak. These fenders are in a position very unfavorable to durability and hence they soon become unserviceable. With a view to prolonging their period of usefulness, they are being treated with two coats of carbolineum avenarius, a well-known wood preservative. If this treatment prolongs the life of the fenders even for a year or two it will amply repay the small cost of applying it.

The U. S. dredge *Burton* was delivered at this harbor late in the fall of 1904. It arrived too late to be of much use before the close of navigation, and it was very soon sent to the harbor of Sandusky, where it was laid up for the winter. As soon as it could be brought to Cleveland in the spring, it was thoroughly overhauled and repaired, and some alterations were made to its steering gear and sea cocks. It has been necessary to use it for a greater part of the time since the opening of navigation on emergency work at the harbors to the eastward of Cleveland. It was brought to Cleveland on the 13th of June and put to work in the east basin immediately eastward of the channel in prolongation of the jetties, where a recent deposit had reduced the depth of the water in some places to as little as 17 feet. The material to be dredged proved to be very light and fine, so easily held in suspension that it would not settle in the bins while the pumps were in operation. This is a difficult material to handle with any kind of a dredge, and is particularly unfavorable for one of the sea-going suction type. As this material would not settle it was necessary to close the overflows, fill the bins, and take the fluid material to the dumping ground. About one-quarter of the time would be spent in pumping and three-fourths were required for dumping. The material excavated could not be measured in the bins and an effort was made to determine its quantity by accurately ascertaining the difference in the draft of the vessel when its bins were filled with clear water and when filled with this thin material. The method followed apparently gave results that were too small, for in a period of 140½ working hours, of which about 37 were spent in pumping, the indirect method indicated the removal of about 18,000 cubic yards while comparative surveys of the area dredged showed that at least 20 per cent more had been taken away.

The ability of the machine to handle this class of material depends very largely upon the character of the drags. It is understood that a more successful type than that in use here has been developed at Charleston, S. C. The plans of this drag have been obtained, and a set is now being manufactured for use on the *Burton*. It is believed that they will very largely increase its output.

Work under the continuous contract for improving the main entrance at Cleveland Harbor has been continued during the fiscal year when the season would permit, and the contract is now about 37 per cent completed. It should be about 50 per cent completed to conform to the rate of progress required by the contract. The work of extending the main breakwater eastward has also been continued and is now 38 per cent completed. This is about 1½ per cent in advance of the contract requirements, but the work done is easier and capable of more rapid execution than that which remains to be completed.

The sundry civil act of March 3, 1905, appropriated \$180,800, under the authorization of the act of 1896, for continuing the improvement at the harbor of Cleveland. This money was appropriated particularly to permit of the repair of that portion of the shore arm of the west breakwater which lies between the 200-foot opening and the harbor line, and also to permit sheathing of the west breakwater with hard-wood timber on the harbor side, and to strengthen and reenforce it by a riprap of heavy stone upon the lake side. Plans and specifications for this work have been prepared and three separate contracts have been let for its execution.

The river and harbor act of March 3, 1905, appropriated \$200,000 for maintenance and continuing the improvement. It is proposed to apply this sum to deepening the sheltered area to 25 feet in accordance with the general plan of improvement of the harbor. An allotment of \$150,000 has been made for carrying on this work by contract, and a contract has been let at a price which will permit the removal of about 1,200,000 cubic yards. This much can be regarded as an advancement of the project. Fifty thousand dollars has been allotted to the operation of the United States dredge. This will be used mainly for removing the annual deposit which takes place in the basin. Experience will be necessary to determine how far in addition to this it will advance the project, but for the present it must be regarded as an expenditure for maintenance only.

The following is a tabular statement of expenditures made on account of improving harbor at Cleveland, Ohio, for the fiscal year 1905:

*General improvement.*

<b>General administration:</b>		
Office and engineering .....	\$595. 50	
Supplies .....	400. 46	
Purchase, care and repair of plant .....	793. 45	
Physical observations .....	187. 75	
Travel and miscellaneous .....	401. 54	
		<hr/> \$2, 378. 70
<b>Repair of east pier:</b>		
Materials .....	178. 37	
Services .....	785. 75	
		<hr/> 964. 12
<b>Repair of east breakwater:</b>		
Materials .....	1, 901. 53	
Services .....	7, 516. 78	
		<hr/> 9, 418. 31
Dredging (the L. P. & J. A. Smith Company), inspection (spring, 1904) .		65. 50
<b>Repair of west breakwater (Hunkin Brothers' contract):</b>		
Paid to contractor .....	14, 205. 88	
Inspection .....	1, 507. 33	
		<hr/> 15, 713. 21
<b>Repair of west breakwater (open market):</b>		
Materials .....	286. 83	
Services .....	109. 33	
		<hr/> 396. 16
Allotment for part payment of dredge <i>Burton</i> .....		9, 300. 00
<b>Operation and care of dredge <i>Burton</i>:</b>		
Services .....	4, 728. 85	
Supplies .....	1, 303. 34	
Subsistence .....	1, 320. 33	
Repairs .....	5, 090. 56	
		<hr/> 12, 443. 08
Taking soundings, west basin, services .....		199. 50
		<hr/> 50, 878. 58
<b>Total expended .....</b>		<b>50, 878. 58</b>



*Main entrance and new breakwater.***Main entrance:**

## General administration—

Office and engineering .....	\$2, 436. 00	
Supplies .....	57. 51	
Purchase, care, and repair of plant ....	405. 55	
Physical observations.....	233. 33	
Travel and miscellaneous .....	68. 79	
	<hr/>	\$3, 201. 18

Construction of main entrance (contract,  
L. P. & J. A. Smith Company)—

Paid to contractor .....	153, 539. 39	
Inspection and superintendence .....	10, 761. 09	
	<hr/>	164, 300. 48
		<hr/>
		\$167, 501. 66

**East breakwater extension:**

## General administration—

Office and engineering .....	4, 872. 00	
Supplies .....	115. 01	
Purchase, care, and repair of plant ....	811. 11	
Physical observations.....	466. 67	
Travel and miscellaneous .....	137. 59	
	<hr/>	6, 402. 38

Construction of breakwater (Hughes Bros.  
& Bangs, contract)—

Paid to contractor .....	459, 381. 41	
Inspection and superintendence. ....	16, 108. 98	
	<hr/>	475, 490. 39
		<hr/>
		481, 892. 77

Total expended ..... 649, 394. 43

For a detailed description of the work done at this harbor during the past year, and for a statement of cost and quantities of materials used, attention is respectfully invited to the report of Assistant Engineer G. T. Nelles, which is transmitted herewith.

An appropriation of \$800,000 is recommended for this harbor, of which \$550,000 is from the authorization of the river and harbor act of 1902, and will be used in continuing the work on the main entrance and the east breakwater extension. One hundred and fifty thousand dollars is for continuing the improvement to obtain a depth of 25 feet in the channel and sheltered area by dredging, and \$100,000 is for maintenance of improvement, and will be used in repairing and maintaining the jetties and breakwaters and in maintaining the required depths in the channels and sheltered areas.

*Money statements.*

UNDER CONTRACTS, ETC., AUTHORIZED BY ACT OF JUNE 3, 1896.

July 1, 1904, balance unexpended .....	\$49, 531. 73
Proceeds from sale of Government property.....	9. 96
Amount appropriated by sundry civil act approved March 3, 1905....	180, 800. 00
Collections on account of damages to pier .....	100. 00
	<hr/>
	230, 441. 69
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	28, 668. 51
July 1, 1905, balance unexpended.....	201, 773. 18
July 1, 1905, outstanding liabilities .....	387. 64
July 1, 1905, balance available .....	201, 385. 54
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	127, 405. 00
	<hr/>
Amount (estimated) required for completion of existing project.....	35, 000. 00

## NEW ENTRANCE, BREAKWATER EXTENSION, ETC., ACT OF JUNE 13, 1902.

July 1, 1904, balance unexpended.....	\$899, 896. 23
Amount appropriated by sundry civil act approved March 3, 1905....	450, 000. 00
	<hr/>
	1, 349, 896. 23
June 30, 1905, amount expended during fiscal year, for works of im- provement.....	649, 394. 43
July 1, 1905, balance unexpended .....	700, 501. 80
July 1, 1905, outstanding liabilities.....	28, 849. 30
	<hr/>
July 1, 1905, balance available .....	671, 652. 50
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	1, 783, 902. 27
	<hr/>
Amount (estimated) required for completion of existing project.....	2, 843, 956. 00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unex- pended July 1, 1905 .....	550, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

### MAINTENANCE (DREDGING) AND CONTINUING IMPROVEMENT.

July 1, 1904, balance unexpended .....	\$43, 750. 92
Amount appropriated by river and harbor act approved March 3, 1905. ....	200, 000. 00
	<hr/>
	243, 750. 92
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	22, 210. 07
	<hr/>
July 1, 1905, balance unexpended .....	221, 540. 85
July 1, 1905, outstanding liabilities .....	217. 73
	<hr/>
July 1, 1905, balance available .....	221, 323. 12
	<hr/> <hr/>
Amount (estimated) required for completion of existing project .....	328, 400. 00
	<hr/> <hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement .....	\$150, 000. 00
For maintenance of improvement .....	100, 000. 00
	<hr/>
	250, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

**AMOUNT AND DATE OF ALL APPROPRIATIONS.**

March 3, 1825 .....	\$5, 000. 00	June 25, 1868 (allotment) .....	\$17, 000. 00
March 2, 1837 .....	10, 000. 00	April 10, 1869 (allotment) .....	13, 380. 00
March 29, 1829 .....	12, 179. 00	July 11, 1870 .....	20, 000. 00
April 23, 1830 .....	1, 786. 56	March 3, 1871 (allotment for repairs) .....	636. 77
March 2, 1831 .....	3, 670. 00	March 3, 1873 .....	1, 000. 00
July 3, 1832 .....	6, 600. 00	June 24, 1874 .....	30, 500. 00
June 28, 1834 .....	13, 315. 00		
July 2, 1836 .....	15, 006. 59		
March 3, 1837 .....	10, 000. 00	Total previous to adoption of proj- ect for harbor of refuge .....	346, 881. 61
July 7, 1838 .....	51, 836. 00	March 3, 1875 .....	50, 000. 00
June 11, 1844 .....	25, 000. 00	August 14, 1876 (repair of pier) .....	8, 000. 00
August 30, 1852 .....	30, 000. 00		
March 3, 1853 .....	145. 69		
June 28, 1864 (allotment) ..	20, 000. 00		
June 23, 1866 .....	59, 806. 00		

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August 14, 1876 .....	\$50,000.00	March 6, 1903 (received on	
June, 18, 1878.....	100,000.00	account of damages to	
March 3, 1879.....	100,000.00	west jetty).....	\$200.00
June 14, 1880 .....	125,000.00	April 28, 1904 .....	485,200.00
March 3, 1881.....	200,000.00	February 4, 1903 (unex-	
August 2, 1882 .....	175,000.00	pended balance of allot-	
July 3, 1884.....	100,000.00	ment of \$6,000 for repair	
August 5, 1886.....	93,750.00	of levee of Muskingum	
August 11, 1888 .....	100,000.00	River, for improving har-	
September 19, 1890 .....	75,000.00	bor at Cleveland, Ohio).	56.52
July 13, 1892.....	100,000.00	February 8, 1905 (proceeds	
August 18, 1894 .....	50,000.00	of sale of Government	
June 3, 1896.....	80,000.00	property).....	9.96
June 4, 1897.....	350,000.00	March 3, 1905 .....	830,800.00
July 1, 1898.....	294,000.00	March 15, 1905 (received	
March 3, 1899.....	75,000.00	on account of damages	
March 3, 1899.....	100,000.00	to pier) .....	100.00
June 6, 1900 .....	175,000.00		
June 13, 1902 .....	625,000.00	Total .....	5,023,575.53
June 28, 1902.....	107,000.00	Expended to June 30, 1905.	3,899,759.70
March 3, 1903.....	227,500.00		
September 6, 1902 (re-		Unexpended July 1,	
ceived on account of		1905 .....	1,123,815.83
damages to west jetty) ..	77.44		

## LIST OF CONTRACTS IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

### *Contract for repair of West Breakwater.*

Name of contractor: Hunkin Brothers, Cleveland, Ohio.  
Date of contract: April 28, 1897.  
Date of approval: May 19, 1897.  
Date of commencement: August 3, 1897.  
Date of completion: September 6, 1904.

### *Contract for improvement and enlargement of Cleveland Harbor, Ohio, eastern division.*

Name of contractor: Hughes Brothers & Bangs, Syracuse, N. Y.  
Date of contract: November 20, 1902.  
Date of approval: December 30, 1902.  
Date of commencement: April 1, 1903.  
Date of completion: December 31, 1908.

### *Contract for improvement and enlargement of Cleveland Harbor, Ohio, western division.*

Name of contractor: Hughes Brothers & Bangs, Syracuse, N. Y.  
Date of contract: November 20, 1902.  
Date of approval: December 30, 1902.  
Date of commencement: April 1, 1903.  
Date of completion: December 31, 1908.

### *Contract for improvement and enlargement of main entrance to Cleveland Harbor, Ohio.*

Name of contractor: The L. P. & J. A. Smith Company, Cleveland, Ohio.  
Date of contract: November 19, 1902.  
Date of approval: January 9, 1903.  
Date of commencement: April 20, 1903.  
Date of completion: December 31, 1907.

COMMERCIAL STATISTICS.

The following statistics for the year 1904 relative to the commerce of the harbor of Cleveland, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Coal and coke .....	2,750	Coal and coke.....	3,053,364
Fish .....	4,000	Flour.....	3,585
Flour .....	330	Grain and produce.....	15
Grain and produce.....	51,200	Iron ore .....	2,852
Iron ore.....	3,985,082	Iron, pig.....	5,012
Iron, pig.....	3,245	Lime, plaster, etc.....	1,731
Lime, plaster, cement, and stone.....	1,017,623	Lumber, logs, etc.....	202
Lumber, logs, etc.....	536,794	Package freight.....	596,694
Package freight.....	84,353		
Salt.....	1,585		
Total.....	5,686,962	Total .....	3,663,455

Total freight tonnage:	
1904 .....	9,350,417
1903 .....	10,050,433
Decrease .....	700,016

Vessels.	Number.	Tonnage.
Entering .....	3,646	3,884,147
Departing.....	3,675	3,881,981
Built.....	9	24,509

Total registered tonnage (vessels entering and departing):	
1904 .....	7,766,128
1903 .....	9,126,100
Decrease .....	1,360,072

Draft of largest vessels using harbor, 25 feet.  
Largest vessels do not load to full depth.  
New vessel lines established as follows: The Potter-Teare Transit Company; The Alleghany Transportation Company; The Interlakes Transportation Company; The Columbia Steamship Company; The England Transit Company; Lakewood Steamship Company; The Buffalo and Susquehanna Steamship Company.

REPORT OF MR. G. T. NELLES, ASSISTANT ENGINEER.

CLEVELAND, OHIO, June 30, 1905.

COLONEL: I have the honor to submit the following report of operations carried on under my local supervision at Cleveland Harbor, Ohio, during the fiscal year ending June 30, 1905.  
*West breakwater repairs.*—This work was done by Hunkin Brothers, of Cleveland, Ohio, under a continuous contract, dated April 28, 1897, and three supplementary agreements. At the beginning of the present fiscal year all of the old superstructure had been renewed with concrete and the contract completed except the sheathing of a short length on the lake side, which was finished on September 6, 1904. After a careful examination of the under-water work by our own diver, the work was accepted and the final estimate made on October 8.  
The following statement shows the character, estimated quantities, and cost of the

# 2342 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

work to be done under this contract, the work accomplished during the year, and the actual total quantities and cost of all work done:

Items.	Contract price per unit.	Estimated total—		For year.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.
White-oak sheathing, M feet.....	\$139.00	368,076	\$51,162.56	2,772.33	\$3,853.54	295,367.0	\$41,056.01
White-oak walling, M feet.....	139.00					46,300.0	6,435.70
Hemlock timber, M feet..	17.25	261,900	4,517.78			207,046.0	4,606.54
Old timber.....do....	9.85	595,000	5,860.75			507,049.6	4,994.44
Concrete blocks, cubic foot.....	.494	250,310	123,486.27	1,892.66	933.71	247,166.6	121,935.52
Concrete steps, cubic foot.....	.494	450	222.00	279.0	137.64	434.0	214.11
Concrete mass, cubic yard.....	5.32	40,700	216,524.00	71.3	379.32	40,717.5	216,617.10
Lag screws.....pound..	.03	88,230	2,646.90	7,198.0	215.94	68,452.0	2,053.56
Screw bolts.....do....	.03	12,300	369.00			10,993.0	329.79
Iron rods.....do....	.13	64,104	8,333.52			57,818.0	7,516.34
Mooring rings.....do....	.10	3,710	371.00			4,004.0	400.40
Wire nails.....do....	.05	7,000	350.00			10,618.0	530.90
			413,843.78		5,520.15		406,690.41
<i>Supplementary agreement, Aug. 25, 1897.</i>							
White-oak fenders, M feet.....	45.00	110,240	4,860.80	4,736.0	213.12	106,252.0	4,781.34
Iron set in masonry, pound.....	.06	54,823	3,289.38	680.0	40.80	69,705.0	4,182.30
			8,250.18		253.92		8,963.64
<i>Supplementary agreement, Feb. 7, 1899.</i>							
Oak timber.....M feet..	45.00					2,652.0	119.34
Divers and helpers, per hour.....	3.24					393.0	1,273.32
New timber (outside walls).....M feet..	50.00					6,705.0	335.25
Riprap between cribs, cubic yard.....	3.00					152.0	456.00
Hemlock (new cribs), M feet.....	40.00					96,187.0	3,847.48
Filling stone, cubic yard.....	2.40		23,282.18			1,463.9	3,513.36
Lag screws.....pound..	.03					16,947.0	508.41
Screw bolts.....do....	.03						
Iron rods.....do....	.13						
Wire nails.....do....	.05						
Labor, repairing break, raising and reenforcing old cribs.....							11,165.28
Dredging along harbor face of break.....							1,569.00
White-pine timber, M feet.....	a 22.00					9,312.0	245.84
Wire nails.....pound..	a.05					630.0	37.80
			23,282.18				23,071.08
Total cost.....			445,376.14		5,774.07		438,725.13

a Plus 20 per cent.

A considerable movement between adjacent concrete superstructure blocks has always been noticed in the west breakwater even when a comparatively light sea was running; this movement has resulted in chipping the edges at the joints and has disfigured the work to a very considerable extent. Early in the present year it was decided to cut out and repair the injured parts with concrete. A small force of day laborers has been engaged at this work since July 25, 1904, and about one-half of the superstructure has been thus repaired at a cost of \$1,618.55. In order to strengthen the substructure of these cribs and to prevent as far as possible the movement of the blocks, it has been decided to make a filling of riprap stone, amounting to 10 tons per linear foot along the lake side of the structure, and also to sheathe the entire

inside face below water with 3-inch hard-wood sheathing. A contract for the riprap filling has recently been awarded to Edward M. Graves, of Indianapolis, Ind., at an estimated cost of \$45,150, and for the sheathing to Walter V. Metcalf, of Cleveland, Ohio, at an estimated cost of \$22,537.20.

Reference was made in my last annual report to the dilapidated condition of the shore end of the old west breakwater, between the west opening and the harbor line; the attention of the proper authorities having been called to this matter it was decided that the funds available could be applied to these repairs. Accordingly, plans and specifications were prepared for the repairs necessary to make this part compare in strength and appearance with the remainder of the west breakwater, and a contract has been entered into with the Hunkin Brothers Construction Company, of Cleveland, Ohio, to do the necessary work at a total estimated cost of \$82,255.

Active preparations are being made for starting the three contracts above mentioned, and it is expected that they will be well under way by the middle of July.

*Dredging.*—No contract dredging work has been done in Cleveland Harbor during the present fiscal year. The U. S. dredge *Burton*, which was built especially for work in this district, reached Cleveland from the coast on November 18, and after fitting out for dredging work was tested in the east basin between November 26 and December 3. The material raised was a soft mud and silt, which settled in the bins so slowly that it was impossible to obtain anything like a proper load. In fact, after working for an hour or more it frequently happened that little or nothing could be felt with a sounding pole in the bottom of the bins. It was also found that after the bins were full nothing worth while was gained by continued pumping. A very careful analysis of the material raised indicated that from 60 to 100 cubic yards of solid matter could be dredged in this manner per load. Owing to unfavorable weather and the necessity for getting the dredge into winter quarters before a general freeze up took place, all further operations were suspended on December 3 and the dredge sent to Sandusky for the winter.

On March 23 of this year the *Burton* again returned to Cleveland and on the 29th was placed in dry dock for the purpose of enlarging her rudder, reversing her wheels, replacing several plates that had been injured while passing through the Welland Canal, and raising a number of sea cocks, which were found to admit too much sand and grit. It was thought from the tests made in November that the boat did not handle as well as she should for work of this kind, consequently on the advice of the officers of the American Ship Building Company the rudder was lengthened from 6 feet to 10 feet and increased 50 per cent in area. The wheels were also reversed, so as to turn outward instead of inward. This work was completed on April 8, and on the 10th, after again testing her machinery and making a few observations to determine the effect of the new rudder and of reversing her wheels, the *Burton* left for Ashtabula, where her services were urgently required to remove the bar at the entrance to that harbor. The observations made to determine the effect of enlarging the rudder and changing the wheels show quite clearly the benefit of the increased rudder, the turning radius having been reduced thereby from 830 to 690 feet. It was not evident, however, that the change in the direction of the revolution of the wheels had any effect in changing the turning radius of the ship when operated with her wheels alone, although the master of the ship states that there has been a very decided improvement in her handling qualities.

On June 13 the *Burton* returned to Cleveland, having removed the bars at the entrance to the harbors of Ashtabula, Conneaut, and Fairport, and handled a total of 46,016.5 cubic yards at a field cost of \$5,459.53, or 11.8 cents per cubic yard.

After some necessary repairs to her wheels, dredging operations were resumed on the 15th in the east basin in front of the Cuddy-Mullen docks, where a bar on which the depth was only 17 feet had formed during the fall and winter. The material encountered has been almost invariably a soft mud or silt, which will only settle in the bins after standing a number of hours. Taking advantage of the experience gained at Cleveland last fall and at Conneaut, Ohio, this spring, where quite similar material was encountered, the overflow openings were closed up, and when the bins were pumped as full as possible the load was taken out and dumped.

In order to measure material of this kind it was found necessary to put two gauges in the ship, by which the displacement can be read to hundredths. By means of these gauges the difference in displacement due to a dredged load and a load of clear water of similar size is obtained. This difference is easily reduced to tons, and by means of a number of very careful observations made last fall, to cubic yards. The gauges were in successful operation during five days at the end of June, and from observations then made it was found that an average of 80 cubic yards of solid mate-



rial per load was being dredged. Based on this determination the work of the *Burton* in Cleveland harbor has been as follows:

Number of loads dredged.....	224
Total time actually pumping.....hours..	37½
Average time per load.....minutes..	10
Total time dumping.....hours..	103½
Average time per load.....minutes..	28
Total quantity dredged.....cubic yards..	17,920
Average quantity per minute.....do....	8
Average efficiency.....per cent..	13
Total field cost.....	\$2,298.79
Cost per cubic yard.....	\$0.128

A survey of the area dredged by the *Burton* shows that fully 20 per cent more material has been removed than indicated above.

The sum of \$150,000 was allotted from the funds available, for dredging by contract in Cleveland Harbor, Ohio, to a depth of 25 feet, as authorized by act of June 3, 1902. In view of the rumored improvement of the dock frontage in the west basin by the railway companies it was decided to confine operations under this allotment to a strip about 600 feet wide along the harbor line in the west basin, widened out at the main entrance channel so as to provide easy access to the improved area and the proposed railroad docks. Bids for doing this work, which were opened on May 22, were deemed excessive. The work was accordingly readvertised and the bids opened the second time on June 19. The proposal of the L. P. & J. A. Smith Company to do the work at 11½ cents per cubic yard was the lowest received, and the necessary contract with this company is now being executed.

*East breakwater repairs.*—These repairs have been continued throughout the year and are now rapidly nearing completion. There yet remains to be put in place about 1,000 linear feet of upper sheathing on the lake side and to be fully bolted about 90 linear feet of under water sheathing on the harbor side.

The following is a summary of work accomplished during the year and the totals to date:

	During year.	Total to date.
Sheathing hung on lake side below water.....linear feet..	480	2,035
Sheathing bolted on lake side below water.....do.....	578	2,035
Sheathing completed on lake side above water.....do.....	557	1,069
Sheathing hung on harbor side below water.....do.....	475	2,300
Sheathing bolted on harbor side below water.....do.....	1,009	2,209
Sheathing completed above water on harbor side.....do.....	975	2,300
Beech used for sheathing below water.....feet B. M..	55,045	151,221
Oak used for sheathing below water.....do.....		7,208
Bolts and spikes used.....pounds..	16,546	56,682
Oak used for sheathing above water.....feet B. M..	41,596	103,296
Cost:		
Labor.....	\$6,318.70	\$19,164.15
Material and plant.....	2,330.36	24,487.73
Total.....	8,649.06	43,651.88

*Miscellaneous repairs.*—The oak fenders and concrete superstructure of the outer 322 linear feet of the east pier have been very thoroughly repaired during the past two months, by cutting out and replacing the broken and disintegrating concrete and by entirely rebuilding the box fenders, at a cost of \$1,167.28. In addition to repairing the concrete superstructure of the west breakwater the oak fenders have been given two coats of carbolineum. The work of thoroughly repairing the concrete superstructure of the west pier and painting the oak fenders with carbolineum has been commenced, but very little has yet been accomplished.

During the winter and early spring our launch, tugboat, barges, and other floating plant were repaired and put in condition for the season's work.

*New main entrance.*—The improvement and enlargement of the main entrance to Cleveland Harbor is being executed by the L. P. & J. A. Smith Company, of Cleveland, Ohio, under a continuous contract dated November 19, 1902, and a supplementary agreement dated May 12, 1904, which provides for certain changes in the quantities and arrangement of the core filling as described and illustrated in the last annual report.

Under the terms of this contract, work to the value of \$150,000, less the cost of



supervision and inspection, should have been completed by December 31, 1903, and a similar amount during each calendar year, when funds were provided. During the first year these contractors earned \$50,838.36; during the second year \$167,735.05, and during the third year, to June 30, 1905, \$21,869.03, giving a total of \$240,442.44, for a period during which they should have earned, according to the terms of their contract at least \$320,000. Very little has been done to advance the work during the present working season, and it is feared that a still greater delinquency may be shown at the end of the calendar year.

The character, estimated total quantities, and cost of executing this contract, the quantities and cost of work done during the fiscal year, and the total quantities and cost to date are shown below:

Items.	Contract price per unit.	Estimated total cost.		For year.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.
<i>Two pierheads.</i>							
Hemlock timber, M feet.....	\$26.75	455,000	\$12,171.25			450,368.0	\$12,047.34
Beech timber..M feet..	40.00	38,080	1,523.20			38,080.0	1,523.20
Oak timber.....do....	50.00	3,500	175.00				
Observation chamber..			1,500.00				470.21
Large riprap.....tons..	1.50	8,000	12,000.00			11,156.0	16,734.00
Small riprap.....do....	1.24	18,000	22,320.00			10,895.02	13,509.82
Small paving stone, tons.....	3.50	500	1,750.00				
Bolts, tie-rods, etc., pounds.....	.04	100,000	4,000.00			93,724.0	3,748.96
Concrete blocks, cubic yards.....	10.00	550	5,500.00				
Concrete mass, cubic yards.....	9.00	1,050	9,450.00				
Pipe and fittings, pounds.....	.40	2,000	800.00				
Total .....			71,189.45				48,033.53
<i>Two rubble-mound breakwaters.</i>							
Large riprap.....tons..	1.50	45,000	67,500.00	41,784.48	\$62,676.71	58,284.5	87,428.75
Heavy riprap.....do....	1.55	37,500	58,125.00				
Small riprap.....do....	1.30	85,000	110,500.00	3,242.6	4,215.37	12,197.0	15,856.10
Paving:							
First class.....do....	3.00	30,000	90,000.00				
Second class.....do....	2.90	12,500	36,250.00				
Gravel, core filling, cubic yards.....	.70	75,000	52,500.00	37,525.4	26,267.78	37,525.4	26,267.78
Sand, core filling, cubic yards.....	.40	37,500	15,000.00	43,359.9	17,343.96	43,359.9	17,343.96
Total .....			429,875.00		110,503.82		146,894.59
<i>Riprap protection for present breakwaters.</i>							
Large riprap.....tons..	1.50	44,000	66,000.00	17,954.8	26,932.20	20,987.2	31,480.80
Small riprap.....do....	1.30	14,000	18,200.00	7,565.58	9,835.25	7,565.58	9,835.25
Gravel, core filling, cubic yards.....	.70	28,000	19,600.00	7,562.1	4,033.47	7,562.1	4,033.47
Paving, second class, tons.....	2.90	12,000	34,800.00				
Sand.....cu. yds..	.40			412.0	164.80	412.0	164.80
Total .....			138,600.00		40,965.72		45,514.32
<i>Removing and repairing end of east breakwater.</i>							
Removing old breakwater..cubic yards..	1.50	9,500	4,750.00				
Hemlock timber, M feet.....	40.00	2,000	80.00				
Oak timber....M feet..	100.00	7,000	700.00				
Large riprap.....tons..	1.50	400	600.00				
Bolts, tie-rods, etc., pounds.....	.06	1,000	60.00				
Total .....			6,190.00				
Total cost.....			645,854.45		151,469.54		240,442.44

The present condition of the work is as follows:

The large riprap foundation ridges for the protection work along the old breakwaters are built up to -15. The upper ridges of the west breakwater arm have been built up to -16 on the lake side and to -10 on the harbor side. The core filling is up to -20. The lower foundation ridges and core filling of the east breakwater arm are completed up to -20, and about 700 linear feet of the upper ridge on the lake side is up to -16. Both of the pierheads, which mark the new entrance, are in place, and the concrete blocks, forming the base course for the concrete superstructure, have been nearly all set and secured in place.

There has been a considerable settlement of both breakwaters, apparently due to springs in the bottom of the lake, from which, when the water is clear, gas in considerable quantities can be seen bubbling up.

*East breakwater extension.*—Hughes Bros. & Bangs, of Syracuse, N. Y., are doing this work under two continuous contracts, dated November 20, 1902, and supplementary agreements dated May 12 and October 25, 1904. The first supplementary agreement provides for a change in the relative quantities and in the arrangement of the core filling, as more fully described and illustrated in the last annual report. The second supplemental agreement was made at the request of the contractors, and on their showing that the work would be facilitated thereby by allowing them to prepare in advance for the paving. The agreement provides for the substitution of quarry-run stone, weighing from 10 pounds to 5 tons, for a considerable proportion of the small riprap stone covering over the core filling, only a sufficient quantity of small riprap stone being used to make a proper bed for the paving stones. In order to arrive at a price per ton which would allow the change to be made without increasing the cost to the United States an experimental section 300 feet long was built, from which it was learned that a reduction of 5 per cent from the small riprap-stone price would offset the extra weight of the quarry run stone construction, giving a price of \$1.083 per ton for this class of material. Two thousand feet was built up in this way above the water surface. It was expected that this length would stand in good shape throughout the winter, but in this we were disappointed, as a very considerable settlement took place throughout the whole length prepared. This settlement may have been due to the washing out of the shale from under the quarry run stone, to the washing away of the stones themselves, or to both causes. It is estimated that our loss due to this cause will be about \$10,000.

Under the terms of the contracts with Hughes Bros. & Bangs, work to the value of about \$350,000, less the cost of supervision and inspection, should be done each calendar year. During 1903 the value of work done was \$159,096.22; during 1904, \$455,229.85, and during the present year, up to June 30, 1905, \$134,342.73, a total of \$748,662.80, as compared with a contract requirement of approximately \$725,000.

The paving of the first section was commenced in May, but owing to the failure of the contractors' quarries to produce satisfactory material in sufficient quantities the progress has been very slow. It is now given out by the contractors that in addition to the material from their own quarries they have arranged to furnish sandstone obtained from the quarries of the Cleveland Stone Company at Berea, Ohio, and limestone obtained from the quarries of the Kelley Island Lime and Transport Company at Kelleys Island and Marblehead, Ohio. In order to carry out this branch of work at proper speed it will be necessary to set at least 50,000 tons of paving per annum, which, in view of the shortness of the season, means practically 2,000 tons per week.

The following statement shows the character, estimated quantities and cost of executing these contracts, and the actual quantities and cost of the work done during the present year and to date:

Items.	Contract price per unit.	Estimated total.		Total for year.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.
<i>Pierheads.</i>							
Hemlock timber...M. feet..	\$28.00	180,000	\$5,040.00			177,368	\$4,966.30
Oak timber .....do....	50.00	1,680	84.00				
Beech timber .....do....	45.00	16,320	734.40			16,320	734.40
Large riprap stone....ton..	1.30	3,000	3,900.00			1,185	1,540.50
Small riprap stone ...do....	1.14	6,500	7,410.00			4,513	5,144.82
Small paving .....do....	4.00	250	1,000.00				
Bolts, tie-rods, etc..pound..	.04	40,000	1,600.00			37,639	1,505.56
Concrete blocks, cubic yard.....	11.00	250	2,750.00				

Items.	Contract price per unit.	Estimated total.		Total for year.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.
<i>Pierheads—Continued.</i>							
Concrete mass, cubic yard..	\$8.00	500	\$4,000.00				
Wrought-iron pipe.. pound..	.50	1,000	500.00				
Total .....			27,018.40				\$13,891.58
<i>Rubble mound breakwater, western division.</i>							
Heavy riprap stone... ton..	1.35	75,000	101,250.00			746.5	1,007.78
Large riprap stone... do....	1.30	190,000	247,000.00	73,842.1	\$95,994.73	186,911.5	242,944.95
Small riprap stone... do....	1.14	175,000	199,500.00	5,173.25	5,897.50	58,802	67,084.28
Paving, 1st class... do....	2.75	60,000	165,000.00				
Paving, 2d class... do....	2.70	25,000	67,500.00	3,131.1	8,453.97	3,131.1	8,453.97
Core filling shale, cubic yard.....	.70	200,000	140,000.00	110,693	77,485.10	138,067	96,646.90
Quarry run stone... ton..	1.083			41,444.1	44,883.96	41,444.1	44,883.96
Core filling lake sand, cubic yard.....	.40	100,000	40,000.00	94,279.6	37,711.84	141,222.4	56,488.96
Total .....			960,250.00		270,427.10		517,500.80
<i>Rubble mound breakwater, eastern division.</i>							
Heavy riprap stone... ton..	1.35	75,000	101,250.00				
Quarry run stone... do....	1.083			8,265.5	8,951.54	8,265.5	8,951.54
Large riprap stone... do....	1.30	190,000	247,000.00	80,408.9	104,531.57	80,408.9	104,531.57
Small riprap stone... do....	1.14	175,000	199,500.00	55,583.6	63,365.30	55,583.6	63,365.30
Paving, 1st class... do....	2.75	60,000	165,000.00				
Paving, 2d class... do....	2.70	25,000	67,500.00				
Core filling shale, cubic yard.....	.70	225,000	157,500.00	30,034.3	21,024.01	30,034.3	21,024.01
Core filling lake sand, cubic yard.....	.40	115,000	46,000.00	48,495	19,398.00	48,495	19,398.00
Total .....			983,750.00		217,270.42		217,270.42
Total cost .....			1,971,018.40		487,697.52		748,662.80

The present condition of the work is as follows:

The substructure crib for pierhead at western end is in place and the concrete foundation blocks for same are ready for placing.

The first section is being prepared for paving, and three 4-foot courses of paving blocks have been set on the lake side for a length of 650 feet and one course of angle-footing blocks on the harbor side for a length of 100 feet.

The second section requires an addition of about 7,000 tons of leveling stone to prepare it for paving.

In the third and fourth sections the upper ridges are in and the shale filling up to about —16.

In the fifth section the upper ridges are practically completed; shale-core filling up to —20.

The lower foundation ridges are practically complete in the sixth, seventh, eighth, ninth, and tenth sections, the sand and shale-core filling being up to —21 in the sixth section, to —25 in the seventh section, and to —28 in the eighth and ninth sections.

*Surveys.*—A very complete and satisfactory survey of the whole outer harbor was made in June of this year. By comparison with survey made in January, 1902, covering identically the same territory, it is found that a fill, aggregating 825,400 cubic yards, has taken place over the area considered in three and one-third years, giving an average annual fill of nearly 250,000 cubic yards. This rate shows a very decided increase over previous determinations, which were as follows: Between 1873 and 1896 (as determined by Mr. F. S. Burrows, United States assistant engineer, and published in the Annual Report of the Chief of Engineers, United States Army, for 1898, pp. 2675 and 2676), 100,000 cubic yards per annum, for a total area of 18,365,000 square feet; between 1898 and 1902 (as described in my report for 1902, published in the Annual Report of the Chief of Engineers for 1902, pp. 2276 and 2277), 38,500 cubic yards per annum for exactly the same area covered by the survey of June, 1905. The fill during the past three and one-half years has been greatest in the channel between the Lake Shore Railway bridge and the main entrance, where it amounted to 4.6 feet, or 1.4 feet per annum. In the west basin the fill was 0.84 foot, or 0.25 foot per

annum, and in the east basin 1.35 feet, or 0.4 foot per annum. The deposit in the east and west basins was very uniformly distributed, except near the entrance channel, where it was considerably above the average.

The details of the comparison of the two surveys are shown in the following tabulation, in which the effect of dredging has been determined by reducing the scow measurement 10 per cent:

	West basin.	East basin.	Entrance channel.	Total.
Area considered.....square feet..	7,800,000	8,210,000	996,000	17,006,000
Mean depth:				
January, 1902.....feet..	18.15	22.65	20.02	20.43
June, 1905.....do....	17.31	21.39	19.72	19.42
Approximate fill.....do....	.84	1.26	.30	1.01
Depth dredged.....do....		.09	4.34	.30
Actual fill.....do....	.84	1.35	4.64	1.31
Do.....cubic yards..	242,700	411,700	171,000	825,400

*Lake levels.*—The highest, lowest, and mean elevation of the water surface at the Cleveland gauge for each month of the year, with reference to the mean lake level of 1860 to 1875, are given in the following table:

Month.	Highest elevation.	Lowest elevation.	Mean elevation.
1904.			
July.....	+0.89	+0.40	+0.65
August.....	+ .92	+ .06	+ .35
September.....	+ .40	— .53	+ .06
October.....	+ .12	— .83	— .30
November.....	— .07	—1.38	— .65
December.....	— .45	—2.38	—1.05
1905.			
January.....	— .50	—1.93	—1.26
February.....	—1.30	—1.87	—1.54
March.....	—1.00	—2.01	—1.58
April.....	— .49	—1.40	— .96
May.....	+ .24	— .78	— .29
June.....	+ .60	— .32	+ .21
For fiscal year 1905.....	+ .92	—2.38	— .53

The plane of reference for the Cleveland gauge is the high water of 1834, 575.107 feet above mean tide at New York. The zero of the gauge is set at the mean level for 1860 to 1875, 2.34 feet below the plane of reference and 572.767 feet above mean tide at New York.

*Work done by the city.*—The work at Erie street has been continued, and two of the docks are now being prepared for occupancy for commercial purposes. The area behind the bulkhead at Erie street is being rapidly filled with excavated material and waste from the city, and it is only a question of a short time when this area will be available for park or other purposes. The river has been widened between Columbus and Voltaire streets, at a cost of about \$12,000, so as to provide ample room for vessels of the largest type. The new channel at Jefferson street is being dredged at a cost of about \$30,000, and the construction of a new lift bridge is under way. Dock lines have been established to a point about 1,800 feet south of the upper Wheeling and Lake Erie Railway bridge, the city having purchased the necessary land for straightening the river and providing a winding basin at the weigh dock, where vessels 600 feet in length can be turned. In addition a considerable amount of new bulkhead has been built and contracts are about to be let for dredging out a 200-foot channel to the plant of the Cleveland Furnace Company.

The east breakwater extension has been carried on under the local supervision of Inspector Antony Mommertz. All other work in Cleveland Harbor has been under the local supervision of Junior Engineer L. C. Schnell.

Very respectfully,

G. T. NELLES,  
United States Assistant Engineer.

Lieut. Col. DAN C. KINGMAN,  
Corps of Engineers.

## P P 8.

## IMPROVEMENT OF FAIRPORT HARBOR, OHIO.

For a description of the location, projects of improvement, and the general conditions at this harbor, see pages 2676 and 2677, Report of Chief of Engineers, 1898.

The engineering problem presented by the harbor of Fairport was very thoroughly discussed in the Annual Report of the Chief of Engineers for 1903. See pages 2084 to 2087, inclusive, of the report. This discussion will not be repeated here.

As a result of this discussion the project has been modified under authority of Congress by the river and harbor act of March 3, 1905, so as to permit the west breakwater to be connected with the shore. This will be a very valuable improvement to the harbor and will greatly assist in maintaining navigable depths in the channel. Plans and specifications for the execution of this work have been prepared. A rubble-mound structure has been adopted. It is to be built entirely of stone and covered upon the top and sides with very heavy blocks of stone instead of the ordinary form of pavement. Proposals were invited for the execution of the work, but the prices received exceeded the estimated cost by more than 50 per cent. The bids were all deemed unreasonable and were rejected, and the work has been readvertised.

At the beginning of the fiscal year work was in progress for rebuilding and repairing the inner ends of both jetties and for sheathing the outer portions with hard-wood plank. The Donnelly Contracting Company, of Buffalo, N. Y., was the contractor, and work had been about 94 per cent completed. It was continued and the whole was finished on the 19th of September, 1904. The amount earned during the year by the contractor was \$7,313.36, and the total amount earned was \$115,535.56. The work was of good character and very satisfactory.

In addition to the foregoing, minor work of repair and maintenance has been carried on from time to time as necessary by hired labor, the total amount expended in this way being about \$3,000.

In the fall of 1904 the east jetty was injured by being struck a glancing blow by the steamer *Princeton*. The estimated cost of making good the damage was \$101.50. This amount has been paid by the owners of the vessel and placed to the credit of the appropriation. When the repairs were finally made the estimate proved to be too small, the actual cost being \$186.37.

Notwithstanding the fact that the channel through the bar in advance of the jetties had been thoroughly dredged out in the spring of 1904, it again formed so as to obstruct navigation, and in the latter part of August it was necessary to redredge. About 4,000 yards was taken out at this time, affording a rather narrow channel. Subsequently, in October, about 6,000 yards more were removed. In the spring of 1905 there was again trouble at this place, and the U. S. dredge *Burton* was at once sent to restore the channel. Between the 23d of May and the 13th of June this machine dredged 21,016 yards of material, at a field cost of \$1,770.84, leaving an ample channel, but there is no assurance that this channel will last through the season.

The following is a tabulated statement of expenditures prepared

from the vouchers for improving harbor at Fairport, Ohio, for the fiscal year 1905:

## General administration:

Examinations and surveys .....	\$81. 47	
Office and engineering .....	1, 527. 00	
Travel and miscellaneous .....	184. 29	
Plant, purchase and repair of .....	90. 82	
Physical observations .....	290. 00	
		\$2, 173. 58

## Contract with the Donnelly Contracting Company:

Paid to contractor .....	19, 778. 01	
Paid for inspection .....	557. 50	
		20, 335. 51

## Maintenance and repair of piers:

Materials .....	808. 78	
Services .....	2, 286. 55	
		3, 095. 33

## Dredging (open market):

Baltimore and Ohio Railroad Company .....	1, 021. 75	
Detroit Dredging Company .....	1, 078. 56	
Paid for inspection .....	130. 00	
		2, 230. 31

Dredging (Government dredge *Maumee*):

Services .....	325. 41	
Supplies .....	17. 33	
Subsistence .....	14. 58	
		357. 32

Dredging (Government dredge *Burton*):

Services .....	511. 52	
Supplies .....	177. 46	
Subsistence .....	62. 49	
		751. 47

Total expended .....	28, 943. 52
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For a detailed description of the work actually accomplished, together with a tabulated statement of the cost and quantity of material used, attention is respectfully invited to the report of Assistant Engineer G. T. Nelles, which is transmitted herewith.

*Money statement.*

July 1, 1904, balance unexpended .....	\$61, 032. 53
Collection on account of damages to pier .....	101. 50
Amount appropriated by river and harbor act approved March 3, 1905...	135, 000. 00

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196, 134. 03

June 30, 1905, amount expended during fiscal year, for maintenance of improvement.....	28, 943. 52
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July 1, 1905, balance unexpended .....	167, 190. 51
July 1, 1905, outstanding liabilities .....	939. 66

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July 1, 1905, balance available..... 166, 250. 85

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Amount (estimated) required for completion of existing project ..... 345, 000. 00

Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement.....	\$175, 000. 00
For maintenance of improvement.....	20, 000. 00
	195, 000. 00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.



AMOUNT AND DATE OF ALL APPROPRIATIONS.

March 3, 1825 .....	\$1,000.00	August 2, 1882.....	\$10,000.00
May 20, 1826.....	5,620.00	July 5, 1884.....	10,000.00
May 19, 1828.....	9,135.11	August 5, 1886.....	18,750.00
April 23, 1830.....	5,563.18	August 11, 1888.....	10,000.00
March 2, 1831.....	5,680.00	September 19, 1890.....	20,000.00
July 3, 1832.....	2,600.00	July 13, 1892.....	35,000.00
June 28, 1834.....	10,000.00	August 18, 1894.....	20,000.00
July 2, 1836.....	6,000.00	June 3, 1896.....	30,000.00
July 7, 1838.....	10,000.00	March 3, 1899.....	100,000.00
June 11, 1844.....	10,000.00	July 31, 1900 (allotment) ...	3,000.00
August 13, 1852.....	10,000.00	April 15, 1902 (allotment)...	1,800.00
June 28, 1864.....	24,435.24	June 13, 1902.....	200,000.00
June 23, 1866.....	24,072.00	March 3, 1905.....	135,000.00
March 2, 1867.....	60,000.00	Redeposited January 28, 1905..	101.50
June 23, 1874.....	20,000.00		
March 3, 1875.....	15,000.00	Total .....	835,757.03
August 14, 1876.....	5,000.00	Expended to June 30, 1905..	668,566.52
June 18, 1878.....	5,000.00		
June 14, 1880.....	3,000.00	Unexpended July 1,	
March 3, 1881.....	10,000.00	1905 .....	167,190.51

CONTRACT IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

*Contract for reconstructing and repairing parts of east and west piers.*

Name of contractor: The Donnelly Contracting Company, Buffalo, N. Y.  
Date of contract: September 29, 1902.  
Date of approval: October 30, 1902.  
Date of commencement: November 3, 1902.  
Date of completion: September 19, 1905.

COMMERCIAL STATISTICS.

The following statistics for the year 1904 relative to the commerce of the harbor of Fairport, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Flour.....	29,430	Coal and coke .....	241,586
Grain and produce .....	13,600	Iron and steel.....	1,442
Iron ore .....	1,452,416	Stone .....	44
Lumber, logs, etc.....	787	Miscellaneous .....	11,442
Shingles.....	906		
Stone.....	1,200		
Copper .....	5,120		
Miscellaneous.....	23,823		
Total .....	1,527,282	Total.....	254,514

Total freight tonnage:	
1904.....	1,781,796
1903.....	2,480,738
Decrease.....	698,942



2352 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Vessels.	Number.	Tonnage.
Entering.....	341	617,765
Departing.....	331	610,811

Total registered tonnage:	
1904.....	1,228,576
1903.....	1,753,057
Decrease.....	525,481

Draft of largest vessels using harbor, 20 feet.  
Largest vessels do not load to full depth.  
No new vessel lines established during the year.

REPORT OF MR. G. T. NELLES, ASSISTANT ENGINEER.

CLEVELAND, OHIO, *June 30, 1905.*

COLONEL: I have the honor to submit the following report of operations carried on under my local supervision at Fairport Harbor, Ohio, during the fiscal year ending June 30, 1905.

The improvement of this harbor is being made under a project dated March 31, 1896, published in the Annual Report of the Chief of Engineers of that year, pages 2956 to 2958, which contemplates the construction of a small harbor of refuge in the lake at the mouth of the Grand River.

It was originally intended to provide two stone-filled timber-crib breakwaters, starting from entrance pierheads placed 400 feet apart and 1,850 feet out in the lake beyond the end of the west pier. After constructing 828 feet of the inner end of the west breakwater in this manner at a cost of \$125 per linear foot, it was decided that this style of construction was too expensive, and on May 17, 1900, the project was modified so as to make use of rubble-mound construction for the remainder of the breakwaters at a total estimated cost, including the work already done, of \$585,000.

The effect of the 828 feet of the west breakwater in place was such as to give rise to grave doubts of the advisability of completing this project as originally designed, therefore, pending the necessary investigation to determine this effect, it was decided to expend the funds available for the repair and reconstruction of the piers, which were old and in a very dilapidated condition. These repairs were carried out under a contract with the Donnelly Contracting Company, of Buffalo, N. Y., dated September 29, 1902, and comprised the entire removal of the inner 580 feet of the east pier and its reconstruction with stone-filled timber crib work surmounted by a concrete superstructure, the strengthening and repairing of the inner 570 feet of the west pier by means of piling and a concrete and stone superstructure, and the sheathing with 3-inch hard-wood plank of both sides and the outer ends of the substructure cribs, and the complete repair of the timber superstructure of the outer 520 feet of the east pier and 617 feet of the west pier. All of the work above enumerated, except the sheathing and timber superstructure repair of the outer ends of both piers, had been completed at the beginning of the present fiscal year. This work was much delayed by difficulty in obtaining the necessary divers, but was finally completed on September 19, 1904.

The following tabulation shows the character, estimated total quantities and cost of the work comprised by the contract with the Donnelly Contracting Company, as well as the character, actual quantities and cost of the work done during the fiscal year, and the totals to the termination of the contract:

Item.	Contract price per unit.	Estimated total.		For year.		Total to date.	
		Quantity.	Cost.	Quantity.	Cost.	Quantity.	Cost.
<i>East pier reconstruction (580 linear feet).</i>							
Removal old pier, cubic yards.....	\$0.50	7,500	\$3,750.00			7,033.0	\$3,516.50
Dredging.....cubic yards..	.25	15,000	3,750.00			11,000.0	2,750.00
Hemlock timber.. M feet..	28.50	640,000	18,240.00			632,244.0	18,018.95
Old timber decking..do....	22.50	22,000	495.00			4,963.0	111.67
Beech timber.....do.....	36.00	65,000	2,340.00			55,296.0	1,990.66
Oak timber.....do.....	46.25					6,960.0	321.90
Bolts, tie-rods, etc....lbs..	.04	180,000	7,200.00			174,405.6	6,976.22
Concrete blocks, cubic yards.....	11.37	710	8,072.70			734.0	8,353.42
Concrete mass, cubic yards.....	7.50	2,100	15,750.00			1,717.6	12,882.00
Small riprap.....tons..	1.33	10,500	13,965.00			8,608.0	11,448.64
Total .....			73,562.70				66,369.96
<i>West pier reconstruction (570 linear feet).</i>							
Removal old pier, cubic yards.....	1.00	3,500	3,500.00			3,301.8	3,301.80
Other excavations, cubic yards.....	.25	1,800	450.00			1,518.0	379.50
Sheet piling complete, M feet.....	50.00	170,000	8,500.00	5,992.0	\$299.60	154,432.0	7,721.60
Old timber decking..M ft..	27.50	25,000	687.50			8,556.0	235.29
Beech timber.....do.....	46.00	7,000	322.00				
Oak timber.....do.....	56.25					8,046.0	452.59
Hard-wood piles, linear feet.....	.35	17,500	6,125.00			18,300.0	6,405.00
Pile rings and shoes...lbs..	.075	10,000	750.00			783.0	58.73
Bolts, tie-rods, etc...do....	.04	50,000	2,000.00			8,617.8	344.71
Refilling pier, etc., cubic yards.....	1.31	2,000	2,620.00			1,386.7	1,816.58
Back filling sand, cubic yards.....	.44	1,500	660.00			604.0	265.76
Concrete blocks, cubic yards.....	11.25	575	6,468.75			562.4	6,327.00
Concrete mass, cubic yards.....	7.50	1,200	9,000.00			1,218.7	9,140.25
Sawed sandstone, square feet.....	.44	3,800	1,672.00			3,705.0	1,630.20
Total .....			42,755.25		299.60		38,079.01
<i>Sheathing and repairing old piers.</i>							
3-inch beech plank... M ft..	123.00	85,000	10,455.00	41,843.0	5,146.69	72,526.0	8,920.70
Lag screws and washers, pounds.....	.04	30,000	1,200.00	16,233.6	649.34	23,704.0	948.16
Pine plank..... M feet..	44.00	85,000	3,740.00	26,792.0	1,178.85	26,792.0	1,178.85
Pine stringers.....do....	44.00	12,000	528.00				
Hemlock timber.....do....	29.00	30,000	870.00				
Bolts and spikes .pounds..	.04	20,000	800.00	972.0	38.88	972.0	38.88
Total .....			17,593.00		7,013.76		11,086.59
Total cost.....			133,910.95		7,313.36		115,535.56

After observing for nearly four years the effect of the short length of the west breakwater built in 1900, it was decided that the excessive movement of the drift from the west, and the consequent shoaling of the harbor and entrance channel, could best be overcome by connecting the inner end of the present structure with the shore, and by extending the outer end 1,200 feet out into a depth of 29 feet. A recommendation to this effect was contained in the last annual report, and the river and harbor act of March 3, 1905, authorized the Secretary of War to "cause the westerly end of the breakwater to be extended to a point at or near the shore."

Acting under this authority plans and specifications were prepared for a rubble-mound breakwater, running parallel to the line of the piers and connecting the inner end of the timber crib breakwater with the shore. Where the depth is sufficient

the structure will be composed of outside ridges of quarry-run stone, with crest 5 feet below the mean lake level. The space between the ridges is to be filled with small riprap stone so disposed as to leave room for a covering of large placed stone, 7 feet in thickness, with top 10 feet wide at 8 feet above mean level, sloping at 2 to 1 on the lake side and 1.3 to 1 on the harbor side. Where the depth is too small for this style of structure the quarry-run stone foundation ridges are omitted and simply a core of small riprap stone with a 9 foot covering of large placed stone is used, the cross section in both cases being otherwise the same.

The specifications for large placed stone call for approximately rectangular pieces with angles not less than  $60^\circ$  nor more than  $120^\circ$ , weighing from 4 to 8 tons each. The specifications for quarry-run stone call for pieces ranging from 50 pounds to 5 tons, with an average weight of not less than  $1\frac{1}{2}$  tons. A brush fascine mattress 15 inches thick and 10 feet wider than the base of the stonework is provided under the shore end of the breakwater at a depth of 2 feet below mean level. Bids were opened for the above-described work on May 6. The lowest of three bids received being 50 per cent higher than our estimate of cost, all bids were rejected, and the work will be readvertised.

*Dredging.*—Late in August, 1904, the bar across the entrance channel caused so much delay and inconvenience to vessels entering the port that an emergency arrangement was entered into with the Baltimore and Ohio Railroad Company to do the necessary dredging with their own dredge at 25 cents per cubic yard. Work was started on August 27, and by September 7 a channel 125 feet wide and 21 feet deep had been secured by the removal of 4,120 cubic yards. Although this channel was ample for the immediate needs of navigation, it was feared that it might soon shoal up again by reason of the constant movement of material from the westward; consequently another arrangement was made with the same parties to continue the work until a width of 200 feet had been secured, at 22 cents per cubic yard. After working a few hours under this arrangement the dredge broke down, making it necessary for the railroad company to abandon the work. An agreement was immediately made with the Detroit Dredging Company, who happened to have an idle dredge in Cleveland at the time, to continue the work, and dredge not less than 5,000 cubic yards, at 18 cents per cubic yard. A total of 5,992 cubic yards was removed by this company between September 22 and October 4, and a channel 200 feet wide and 21 feet deep secured.

On May 22 of the present year a heavily loaded ore carrier grounded near the entrance to the jettied channel, and in trying to release her the whole channel was so cut up and filled with lumps that for a few days every vessel attempting to cross the bar ran aground, still further aggravating the trouble. The dredge *Burton* was accordingly ordered to Fairport on the morning of the 23d, reaching there about noon. She immediately commenced dredging operations, and so relieved the situation that no further trouble was experienced by vessels after the second day. She remained at Fairport until June 13. During this time she excavated a total of 21,016.5 cubic yards, at a total field cost of \$1,770.84 or 8.4 cents per cubic yard, providing a channel 250 feet wide and 21 feet deep beyond the end of the piers.

The following is a summary of all dredging work done at Fairport during the year:

3,845.0 cubic yards dredged by Baltimore and Ohio Railroad dredge, at 25 cents per cubic yard .....	\$961.25
275.0 cubic yards dredged by Baltimore and Ohio Railroad dredge, at 22 cents per cubic yard .....	60.50
5,992.0 cubic yards dredged by Detroit Dredging Company, at 18 cents per cubic yard .....	1,078.56
21,016.5 cubic yards dredged by U. S. dredge <i>Burton</i> , at 8.4 cents per cubic yard .....	1,770.84
<hr/> 31,128.5 cubic yards dredged during year .....	<hr/> 3,871.15

*Repairs.*—The disastrous flood of January, 1904, left the new part of the east pier badly out of line and grade for a length of 200 feet. In October, when it was thought that all further settlement had ceased, the concrete superstructure was restored to its original form and position by the employment of day labor and the purchase of the necessary materials in the open market. The oak fenders were also raised to proper grade and fastened on with expansion bolts. These repairs were necessarily tedious and expensive, requiring more than ordinary skill and care in the placing of the material and an abnormal expense for forms and fastening, and cost \$1,809.21 or \$14.47 per cubic yard.

In connection with the repairs just described, the 6-inch flagging on the new portion of the west pier was reset on a gravel-concrete foundation, at a cost of \$369.95.

Before the concrete repairs to the east pier had become thoroughly set the pier was struck by the steamer *Princeton*, knocking off one length of oak fender and demolishing about 20 linear feet of the new concrete facing. This damage was repaired in May of the present year at a cost of \$186.37.

No special surveys or observations have been made at Fairport during the present year. It is known, however, from superficial examinations that the conditions heretofore reported still exist and that there has been a constant decrease in the depth of the water behind the breakwater and in its vicinity. This area has in fact become so shallow that there is a constant run of sand from it into the deeper channel and it is consequently essential to excavate to a much greater width and extent than otherwise would be necessary in order to protect the channel by providing storage room for this shifting material.

The local supervision of the work at Fairport has been in charge of Inspector J. N. Winn.

Very respectfully,

Lieut. Col. DAN C. KINGMAN,  
*Corps of Engineers.*

G. T. NELLES,  
*United States Assistant Engineer.*

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## P P 9.

### IMPROVEMENT OF ASHTABULA HARBOR, OHIO.

For a description of the location, original conditions, and the various projects of improvement, see page 2679 of the Report of the Chief of Engineers for 1898.

The present project was adopted in 1896.

The improvement of this harbor is being carried on under a continuous contract approved June 22, 1900, with the Donnelly Contracting Company, of Buffalo, N. Y., and the contract when completed will secure the construction of the two detached breakwaters provided for in the project.

At the beginning of the present fiscal year about 63 per cent of the work under the contract had been completed. The two timber-crib pierheads 50 feet square had been constructed and capped with concrete, and a light-house has since been erected by the Light-House Department upon the westerly pierhead. The work on the breakwaters themselves was well advanced and the greater portion of the substructure was in place.

The contractor was at work at the beginning of the fiscal year at the southerly end of the west breakwater. His working force was small and his plant was entirely inadequate for a work of this magnitude. He was using only a single floating derrick to set the paving stones which cover the upper portions of the work. Considering the size of the plant, however, the progress was fairly satisfactory. Work was carried on over a length of about 400 feet, but the structure was nowhere entirely completed. The total amount earned by the contractor during the fiscal year was \$16,406.82.

At the close of the working season the affairs of the contractor became so involved that a receiver was appointed by the United States court. Since this took place no further work has been done. The receiver has stated in answer to an inquiry that steps were being taken looking to the absorption of the Donnelly Contracting Company by a new company which would finish the work, but it now seems probable that it will have to be completed by the sureties.

As explained on pages 3193 and 3194 of the Annual Report of the

Chief of Engineers for 1904, this contractor in the previous fiscal year built up a length of several hundred feet of the west breakwater to about the level of the water surface to prepare it for the paving. This was of small stone and was without protection until it was covered by the paving. He was repeatedly warned by the United States engineer in charge to complete that portion of the work, and was told that the United States would not assume the responsibility for the loss of this small stone, which would certainly take place if left uncovered during the winter. The contractor failed to protect it, and during the winter following 1,900 tons of small stone was displaced by the action of the waves and floating ice, so that it was pushed outside of the cross section of the breakwater and serves no useful purpose at present. It has been decided by the Chief of Engineers that the contractor must be held responsible for the loss of this stone, and he has been so notified in writing.

Repeated surveys and examinations have been made to determine the condition and progress of the work and the depth of water in the channel, and although no work has been done under contract this spring, it has not been practicable to entirely disband the force locally connected with the improvement. This makes the ratio of the expense for inspection and contingencies unduly large when compared with the amount of work done under contract.

Prior to this year the Pittsburgh, Youngstown and Ashtabula Railroad Company, under authority of the Secretary of War, had removed about 1,000 feet of the old west jetty and replaced the same by a bulkhead built 60 feet farther west. They are now engaged in removing and replacing the remaining portion of the jetty. This new work will widen the channel, afford additional dock frontage, and thus increase the capacity of the harbor.

There remains available about \$159,000 of the appropriation of 1902 which it was originally intended to apply to rebuilding the west jetty, but the expenditure is no longer necessary. Under authority of the river and harbor act of March 3, 1903, it is to be applied to extending the west breakwater about 1,500 feet farther toward the shore. Proposals were invited for the execution of this work, but the lowest bid was unsigned and otherwise fatally defective, and all the other proposals were deemed unreasonable and excessive, and hence all bids were rejected and the work readvertised. New proposals will be opened July 17.

At the close of the fiscal year 1904 dredging was in progress, under an emergency contract with the Detroit Dredging Company, to restore the channel between the jetties and across the bar. The work was not completed until July 11. A total of 27,424 cubic yards of material was removed, at a cost in round numbers, including inspection, of \$8,400. The channel was left in a good condition and remained so during the season of navigation. The storms and freshets of the winter and spring following rebuilt the bar so as to leave a navigable depth over it of not more than 16½ feet. This condition was ascertained by surveys made in March, 1905, and as soon as the ice disappeared the U. S. dredge *Burton* was sent to remove this obstruction. Between the 11th of April and the 29th of April it excavated 11,000 cubic yards, place measurement, at a field cost of \$2,014.99. This was the first work done by the dredge, and it worked at a great disadvantage. The material was a very fine closely packed sand, and the drags at the end of the suction



pipes were not properly designed to break it up and lift it. Experiment is necessary to determine how such material can best be handled by a suction dredge.

The owners of the steamer *M. A. Hanna*, which damaged and destroyed the outer end of the east jetty, have tendered the sum of \$3,375.75 in satisfaction of this injury. This sum covers the cost of cutting away the wreckage and repairing the end of the jetty, and also makes good the value of the portion of the structure which was lost. The offer was accepted by the War Department and the amount has been placed to the credit of the appropriation.

The following is a statement of expenditures for improving the harbor at Ashtabula during the fiscal year 1905:

General administration:	
Office and engineering .....	\$2, 617. 02
Travel and miscellaneous .....	376. 27
Examinations and surveys .....	1, 482. 48
Purchase, construction, and repair of plant .....	783. 45
Maintenance of storehouse .....	168. 22
	<hr/> \$5, 427. 44
Construction of breakwater:	
Paid to contractor .....	19, 908. 77
Inspection .....	1, 544. 78
	<hr/> 21, 453. 55
Dredging:	
Paid Detroit Dredging Company .....	8, 256. 70
Inspection .....	150. 00
	<hr/> 8, 406. 70
Dredging (Government dredge <i>Burton</i> ):	
Services .....	1, 385. 00
Subsistence .....	203. 11
Supplies .....	415. 80
Miscellaneous .....	11. 08
	<hr/> 2, 014. 99
Total expended .....	<hr/> 37, 302. 68

For a detailed description of the work done, and tabulated statements of material and cost, attention is respectfully invited to the report of Assistant Engineer Howard E. Smith, which is transmitted herewith.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$380, 744. 44
Amount appropriated by river and harbor act approved March 3, 1905 ..	20, 000. 00
Collections on account of damages to piers .....	3, 525. 75
Proceeds from sale of Government property .....	1. 00
	<hr/> 404, 271. 19
June 30, 1905, amount expended during fiscal year:	
For works of improvement .....	\$25, 071. 84
For maintenance of improvement .....	12, 230. 84
	<hr/> 37, 302. 68
July 1, 1905, balance unexpended .....	366, 968. 51
July 1, 1905, outstanding liabilities .....	100. 00
	<hr/> 366, 868. 51
July 1, 1905, balance available .....	<hr/> 366, 868. 51
July 1, 1905, amount covered by uncompleted contracts .....	<hr/> 158, 734. 34
<div> <div>{</div> <div>Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....</div> <div>20, 000. 00</div> </div>	
<div> <div>{</div> <div>Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.</div> </div>	

2358 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

AMOUNT AND DATE OF ALL APPROPRIATIONS.

May 26, 1826 .....	\$12,000.00	July 13, 1892 .....	\$70,000.00
May 19, 1828 .....	2,403.50	August 18, 1894 .....	75,000.00
March 3, 1829 .....	6,940.25	June 3, 1896 .....	50,000.00
March 2, 1831 .....	7,015.00	March 3, 1899 .....	50,000.00
July 3, 1832 .....	3,800.00	June 6, 1900 .....	110,000.00
March 2, 1833 .....	3,400.00	July 2, 1900 (allotment)...	3,000.00
June 28, 1834 .....	5,000.00	March 3, 1901 .....	2,000.00
March 3, 1835 .....	7,591.00	April 30, 1901 (al-	
March 3, 1837 .....	8,000.00	lotment) .....	\$3,000.00
July 7, 1838 .....	8,000.00	Redeposited	
June 11, 1844 .....	5,000.00	April 19, 1902. ....	141.55
August 30, 1852 .....	10,000.00		2,858.45
March 3, 1853 .....	42.60	June 13, 1902 .....	200,000.00
June 23, 1856 .....	24,708.82	June 28, 1902 .....	200,000.00
March 2, 1867 .....	54,000.00	March 3, 1903 .....	118,000.00
March 3, 1871 .....	15,000.00	December 4, 1902 (proceeds	
June 10, 1872 .....	15,000.00	of sale of Government	
March 3, 1873 .....	16,000.00	property) .....	1.00
June 23, 1874 .....	35,000.00	Redeposited July 28, 1904.	150.00
March 3, 1875 .....	25,000.00	Redeposited December 13,	
August 14, 1876 .....	5,000.00	1904 .....	3,375.75
June 18, 1878 .....	12,000.00	Redeposited February 18,	
March 3, 1879 .....	9,000.00	1905 .....	1.00
June 14, 1880 .....	20,000.00	March 3, 1905 .....	20,000.00
March 3, 1881 .....	20,000.00		
August 2, 1882 .....	20,000.00	Total .....	1,371,787.41
July 5, 1884 .....	22,500.00	Expended to June 30, 1905.	1,004,818.90
August 5, 1886 .....	30,000.00		
August 11, 1888 .....	25,000.00	Unexpended July 1,	
September 19, 1890 .....	40,000.00	1905 .....	366,968.51

CONTRACT IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1905.

Contract for constructing east and west breakwaters.

Name of contractor: The Donnelly Contracting Company, Buffalo, N. Y.  
Date of contract: May 15, 1900.  
Date of approval: June 22, 1900.  
Date of commencement: October 1, 1900.  
Date of completion: August 9, 1905.

COMMERCIAL STATISTICS.

The following statistics for the year 1904 relative to the commerce of the harbor of Ashtabula, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Iron ore .....	2,671,367	Coal .....	1,980,104
Stone .....	12,278		
Fish .....	800		
Total .....	2,683,945	Total .....	1,980,104

Total freight tonnage:	
1904 .....	5,664,049
1903 .....	6,330,344
Decrease .....	666,295



Vessels.	Number.	Tonnage.
Entering.....	1,114	2,263,583
Departing.....	1,171	2,338,648

Total registered tonnage:	
1904.....	4,602,231
1903.....	5,357,115
Decrease.....	754,884

Draft of largest vessels using harbor, 20 feet.  
Largest vessels do not load to full depth.  
No new vessel lines established during the year.

REPORT OF MR. HOWARD E. SMITH, ASSISTANT ENGINEER.

ASHTABULA, OHIO, *June 30, 1905.*

COLONEL: I have the honor to submit the following report of operations at Ashtabula Harbor, Ohio, for the fiscal year ending June 30, 1905:

**Breakwater construction.**—This work is being executed by the Donnelly Contracting Company, of Buffalo, N. Y., under continuous contract for building two breakwaters of the rubble-mound type, aggregating about 2,500 linear feet, and two pier heads with stone-filled timber substructures and concrete superstructures, terminating the outer ends of the breakwaters. October 22, 1900, the contractors began to build the timber cribs for the pierheads, and this date marks the commencement of operations under this contract. Work on the west breakwater was started August 14, 1901, and on the east breakwater, July 24, 1902.

Work has been confined to the west breakwater, and was in progress at the opening of the fiscal year. The inner 400 feet of this breakwater engaged the attention of the contractors. Here the breakwater, which had been previously built up to a plane 10 feet below lake surface, was being built up with small stone to finished slopes on both sides and paving stone placed thereon. The work started at the outer end of the timber breakwater, and advanced northward therefrom. The contractors' plant for setting paving stone consisted of one derrick scow and a small deck scow. While it is thought the contractors made a good showing, considering the size of the plant, it is quite apparent that this class of work demands the use of a larger plant in order to advance the work more rapidly during the intervals of favorable weather. At the same time, the larger plant might be so employed as to result in less loss of stone from storm.

The contractors ceased operations at Ashtabula October 31. A few weeks later there was a report that the contractors' affairs had become involved financially, and since then no work has been done up to the close of the present fiscal year.

Soundings have been taken over the work, in cross sections 10 feet apart, and have been repeated as often as the conditions of the work demanded, in order to accurately determine the progress made by the contractors, and to record the losses due to storm. The losses from storm during the season of 1904 amounted to 1,040 tons of small stone. The total amount of small stone placed during the same period is 8,326 tons. The percentage of loss is 12.5.

The following table gives the weights of paving stone used and rate of setting same:

Month.	Days worked.	Number paving stone set.	Average per day.	Maximum for 1 day.	Average weight.	Minimum weight.
1904.					Tons.	Tons.
July.....	8	149	18.65	34	4.0	2
August.....	17	389	22.90	39	3.9	2
September.....	15½	303	19.55	42	4.3	2
October.....	9	156	17.34	25	5.0	2
Total and average.....	49½	997	19.61	42	4.3	2

Work was suspended October 31.

## 2360 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

The following table indicates progress on the work for the fiscal year ending June 30, 1905:

Item.	Quantity.	Unit price.	Value at contract price.
West breakwater:			
Heavy riprap stone .....	355	\$1.43	\$507.65
Small stone .....	5,875	1.16	6,815.00
Paving stone .....	4,273	2.09	8,930.57
Two pier heads: Paving stone for well .....	64		153.60
Total .....			16,406.82

*General progress.*

Item.	Total to June 30, 1905.		Total required.		Per cent completed.
	Quantity.	Prices.	Quantity.	Prices.	
Two pier heads:					
Foundation stone .....	6,737	\$8,488.62	6,737	\$8,488.62	100.00
Concrete blocks .....	9,650	3,956.50	9,650	3,956.50	100.00
Mass concrete .....	740	6,216.00	740	6,216.00	100.00
Filling in superstructure .....	591	709.20	591	709.20	100.00
Oak fenders .....	2,111	97.11	2,111	97.11	100.00
Bolts, washers, and collars .....	1,200	48.00	1,200	48.00	100.00
Wrought-iron pipe .....	331	33.10	331	33.10	100.00
Paving stone .....	64	153.60	64	153.60	100.00
Crib structures .....		16,356.04		16,356.04	100.00
West breakwater:					
Heavy riprap .....	35,039½	50,106.14	38,000	54,340.00	92.00
Core filling .....	66,714½	51,370.17	70,000	58,900.00	95.00
Small stone .....	43,992½	51,031.30	66,000	76,560.00	67.00
Paving stone .....	4,411	9,218.99	18,000	37,620.00	24.50
East breakwater:					
Heavy riprap .....	16,306½	23,318.29	22,500	32,175.00	72.40
Core filling .....	40,512	31,194.24	46,000	35,420.00	88.00
Small stone .....	18,077	20,969.32	49,000	56,840.00	37.00
Paving stone .....			15,500	32,395.00	
Total .....		273,266.62		415,308.17	65.80

*Surveys of and restoration of the channels.*—The usual surveys of the navigable channel were made in December, 1904, and March, 1905. The condition of the channel in 1905 was noted to be very similar to that which obtained in the corresponding period of the preceding year. The level of the lake, however, was considerably lower in the spring of 1905 than in corresponding months for 1904, and this accounts for the difficulty vessels experienced at the opening of the present season of navigation.

For purposes of comparison there follows a table giving the mean monthly readings of the water gauge for several months in the springs of 1904 and 1905:

Month.	1904.	1905.
March .....	−0.6	−1.4
April .....	+ .5	− .8
May .....	+ .7	− .2
June .....	+ .9	+ .3

Emergency dredging in the spring of 1904 was not started until June 2, for reasons noted in the last report, and was continued until July 11 of the present fiscal year. Twenty-seven thousand four hundred and twenty-four and one-half cubic yards of material were dredged. The total payment to the contractor for the dredging, including board of one inspector, was \$8,256.70.

The emergency dredging in the spring of 1905 was accomplished by the new U. S. dredge *Burton*. The work was started April 11 and was completed April 29. Eleven thousand cubic yards of material were removed.

*New breakwater contracts.*—Plans and specifications were prepared in April, 1905, for the extension of the west breakwater 1,500 feet toward shore, and bids were opened June 19. The Edward Gillen Dock, Dredge and Construction Company, of Racine, Wis., was the lowest bidder, and you have recommended the acceptance of the bid to the Chief of Engineers. Taking this bid as a basis of cost, the available funds will admit of the construction of 1,200 linear feet of breakwater.

*Widening of river channel by Pennsylvania Company.*—Following the project of improvement which has been authorized by the Secretary of War, the Pennsylvania Company entered into contract with the Standard Contracting Company in March, 1905, for removing the remainder of the old Government west jetty, 1,130 feet in length, that lies outside the shore line of lake. The inner portion had been removed under another contract in 1903. As a part of the present contract a new jetty is to be built 60 feet westward of the old jetty, thereby adding 60 feet to the width of jettied channel. Work under this contract was begun April 5 and is now well under way.

Yours, very truly,

Lieut. Col. DAN C. KINGMAN,  
*Corps of Engineers.*

HOWARD E. SMITH,  
*United States Assistant Engineer.*

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P P 10.

IMPROVEMENT OF CONNEAUT HARBOR, OHIO.

The project for the improvement of this harbor was adopted in 1896, and is given in full on pages 2970 and 2971 of the Report of the Chief of Engineers for that year.

At the beginning of the present fiscal year the work of improving this harbor was being carried on under a continuous contract with the Donnelly Contracting Company, of Buffalo, N. Y. About 39 per cent of the work had been completed at that time. This comprised all of the subaqueous portion of the new work on the jetties and about 745 linear feet of concrete superstructure. The substructure of the west breakwater extension was built and in place, and preliminary work had been done in connection with the east breakwater. The work was carried on until the end of the working season, 1904, at which time the whole contract was about 71 per cent completed. All of the superstructure of the new part of the jetties was finished, but the fenders had not been put in place. The west breakwater extension was practically completed, the timber-crib pierheads for the east and west breakwaters were in place, and the substructure for 750 linear feet of the east breakwater was sunk and about 264 linear feet of concrete superstructure was built upon it. A portion of the old timber superstructure of the west jetty had been removed and about 400 running feet had been sheathed below water. The rate of progress was satisfactory and indicated a completion of the work within the contract time. In November, however, the affairs of the contractor became involved, a receiver was appointed by the United States court, and all further work under the contract ceased.

It is proper to say that the contractor could not have suffered losses in the execution of his contract, as the prices were good and the work was carried on with system and skill. The losses which led to his failure must have occurred in other lines of business. In reply to an inquiry the receiver has recently stated that this company might be absorbed by another company that would carry out the work, but up to the end of the fiscal year this had not been done. It would seem that unless the Donnelly Contracting Company can be rehabilitated and can pay its indebtedness the work will have to be finished by the sureties.

The money authorized to be expended by the river and harbor act of June 13, 1902, did not suffice for the execution of the entire project. There remained a length of 250 feet of the east breakwater which

could not be provided for with the funds allowed. The river and harbor act of March 3, 1905, provides the means for completing this breakwater. The expenditure of the amount necessary for this purpose has been authorized, but the work has not been placed under contract on account of the unfinished condition of the rest of the work.

In 1902 the steamer *Mecosta* collided with the outer end of the west jetty at Conneaut inflicting damages that cost \$1,345.84 to repair. The matter was placed in the hands of the United States attorney and in due course he collected from the company the sum of \$1,000, which was accepted by the United States in satisfaction of the damage done, and this sum has been placed to the credit of the appropriation.

In September, 1904, the steamer *W. D. Rees* collided with the east jetty near the inner end of the new portion. It struck the superstructure a glancing blow and shifted and displaced one block of mass concrete 29 feet in length. It also broke some of the smaller concrete blocks upon which this mass was resting and generally disturbed the bond between the concrete and the timber. The repairs have not yet been made, but it will probably be necessary to break up the mass concrete, remove the blocks, repair the top of the crib, replace the blocks, and rebuild the mass concrete. The estimated cost of this work is \$866. The owners of the vessel have tendered \$600 in payment of these damages, and upon the advice of the United States attorney their offer has been accepted, and this amount will be placed to the credit of the appropriation.

The depth of water on the bar and between the jetties has maintained itself very well, but in the spring of 1905 the channel was found to be so narrow that it was feared that vessels would have difficulty in following it. Accordingly the U. S. dredge *Burton* was sent to Conneaut and began work there on May 1, continuing until May 19. At the end of this time it had removed 14,000 cubic yards of material, place measurement, and had put the channel in a satisfactory condition. Much of the material to be removed was a river silt, so light that it would not settle in the bins, and to remove it it was necessary to close the overflows, fill the bins by pumping a few minutes only, then to take out the material and dump it. The amount thus carried probably did not exceed 80 yards of solid material to the load. The field cost of this work was \$1,673.70.

The following is a statement of expenditures for improving the harbor of Conneaut, Ohio, during the fiscal year 1905:

General administration:		
Office and engineering .....	\$1, 055. 00	
Travel and miscellaneous .....	137. 57	
Examinations and surveys .....	1, 046. 48	
Purchase and repair of plant .....	106. 71	
Maintenance of light on breakwater .....	54. 95	
		\$2, 400. 71
Construction of breakwaters and piers:		
Paid to contractor .....	157, 853. 01	
Inspection .....	4, 720. 06	
		162, 573. 07
Repair of piers: Materials and services .....		1, 355. 88
Dredging (Government dredge <i>Burton</i> ):		
Services .....	948. 91	
Supplies .....	483. 30	
Subsistence .....	235. 49	
		1, 667. 70
Total expended .....		168, 007. 36

For a detailed account of the operations at this harbor and a tabular statement showing the exact progress of each class of work, attention is respectfully invited to the report of Assistant Engineer Howard E. Smith, which is transmitted herewith.

*Money statement.*

July 1, 1904, balance unexpended .....	\$296, 284. 65
Collection on account of damages to pier .....	1, 000. 00
Amount appropriated by river and harbor act approved March 3, 1905..	60, 000. 00
Proceeds from sale of Government property .....	. 50
	<hr/> 357, 285. 15
June 30, 1905, amount expended during fiscal year:	
For works of improvement .....	\$164, 938. 73
For maintenance of improvement .....	3, 068. 63
	<hr/> 168, 007. 36
July 1, 1905, balance unexpended .....	189, 257. 79
July 1, 1905, outstanding liabilities .....	100. 00
	<hr/> 189, 157. 79
July 1, 1905, balance available .....	<hr/> 126, 795. 16
Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	15, 000. 00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

AMOUNT AND DATE OF ALL APPROPRIATIONS.

March 3, 1829 .....	\$7, 500. 00	July 2, 1900 (allotment) ....	\$3, 000. 00
April 23, 1830 .....	6, 135. 65	March 30, 1901 (al-	
March 2, 1831 .....	6, 370. 00	lotment) .....	\$2, 500. 00
July 2, 1832 .....	7, 800. 00	Redeposited April	
July 2, 1836 .....	2, 500. 00	19, 1902 .....	451. 80
March 3, 1837 .....	5, 000. 00		<hr/> 2, 068. 20
July 7, 1838 .....	8, 000. 00	June 13, 1902 .....	200, 000. 00
June 11, 1844 .....	5, 000. 00	March 3, 1903 .....	10, 000. 00
August 30, 1852 .....	10, 000. 00	April 28, 1904 .....	240, 000. 00
June 23, 1866 .....	20, 513. 74	March 3, 1905 .....	60, 000. 00
March 2, 1867 .....	10, 000. 00	Redeposited November 22,	
April 10, 1869 (allotment) ..	8, 910. 00	1904 .....	1, 000. 00
June 11, 1870 .....	6, 000. 00	February 16, 1905 (proceeds	
March 3, 1873 .....	400. 00	of sale of Government prop-	
June 23, 1874 .....	1, 500. 00	erty) .....	. 50
March 3, 1875 .....	1, 000. 00		<hr/>
June 14, 1880 .....	6, 000. 00	Total .....	848, 698. 09
July 13, 1892 .....	40, 000. 00	Expended to June 30, 1905	859, 440. 30
August 18, 1894 .....	40, 000. 00		
June 3, 1896 .....	40, 000. 00	Unexpended	
March 3, 1899 .....	100, 000. 00	1905 .....	

CONTRACT IN FORCE DURING THE FISCAL YEAR ENDING

*Contract for construction of breakwaters, the extension of and the west piers.*

Name of contractor: The Donnelly Contracting Company,  
Date of contract: November 14, 1902.  
Date of approval: December 22, 1902.  
Date of commencement: April 14, 1903.  
Date of completion: November 15, 1905.

superintendent of the Light-House Department, moved the light-house from its old site on the end of the old west pier to the outer end of the new extension of the same pier. A steel oil house was at the same time erected, also on the new extension near by.

September 21, 1904, the southerly section of superstructure on the east pier extension was damaged by collision of the steamer *W. D. Rees*. The entire section, 29 feet long, including the concrete blocks on which it rested, was displaced at one end about 8 inches laterally, and one or two of the bearing blocks were ruptured. The rectification of this section will necessitate the entire removal and reconstruction of the mass concrete and the replacement of the concrete blocks to their proper alignment.

*East breakwater.*—The foundation for the east breakwater was begun May 4, 1904, and the work was carried through into the present fiscal year. Four cribs, comprising the substructure, were sunk, as follows:

Crib.	Length.	Date of sinking.
	<i>Feet.</i>	
No. 10.....	174	July 11, 1904
No. 11.....	192	July 20, 1904
No. 12.....	192	Aug. 4, 1904
No. 13.....	192	Aug. 21, 1904

Width of all cribs, 20 feet.

As soon as practicable after sinking the cribs riprap stone was placed along the sides of the cribs to protect the foundation. Concrete blocks for the superstructure were placed first September 7, and September 14 the mass concrete work was started and was continued during favorable weather until November 9, when the work was brought to a close. Two hundred and sixteen linear feet of mass concrete had been placed, beginning at a point 59 feet from the outer end of the northerly crib. Concrete blocks had been placed for a farther distance of 100 feet southward, and upon them had been placed two isolated sections of mass work each 24 feet long. The portion of the breakwater covered by this 100 feet suffered considerable movement by storms that occurred between November 11 and November 14. The west side of the breakwater settled a maximum of 1 foot and the east side was raised a trifle. As a result the superstructure was thrown out of line at top about 8 inches. The disalignment has been still further aggravated by the storms of the past winter.

*West breakwater.*—The foundation for the west breakwater extension was partly placed during the season of 1903. This was completed in September of the present fiscal year, and a crib 30 feet wide and 163.5 feet long was sunk September 22. After an interval, allowed for settlement of foundation, the timber superstructure was started and carried to completion by the end of the season. Two hundred and sixteen lag screws yet remain to be placed in the sheathing on the lake side to complete this portion of the work.

*Pierheads.*—The foundation for the west pierhead was partly placed during the season of 1903. This was completed in September of the present fiscal year, and a crib 50 feet square was sunk October 4. The riprap protection is entirely placed. No portion of the superstructure has been added. The foundation for the east pierhead was placed in October, and a crib 50 feet square was sunk November 2. The riprap protection is entirely placed. No portion of the superstructure has been added.

The following table indicates progress on the work for the fiscal year ending June 30, 1905:

Item.	Quantity.	Unit price.	Value at contract price.
Timber crib and concrete piers:			
Concrete blocks.....cubic yards..	800.2	\$10.00	\$8,002.00
Concrete in mass.....do....	2,601.5	7.40	19,251.10
Small riprap stone.....tons..	1,237.0	1.33	1,645.21
Hard-wood sheathing.....feet B. M..	26,771.0	124.00	3,319.60
Hemlock timber in old cribs.....do....	3,127.0	65.00	203.25
Lag screws and washers.....pounds..	10,409.0	.04	416.36
Drift bolts.....do....	469.0	.04	18.76
Spikes.....do....	13.0	.04	.52
Old superstructure removed.....linear feet..	40.0	4.00	160.00
Timber crib and concrete (east) breakwater:			
Heavy riprap stone.....tons..	3,449.0	1.60	5,518.40
Small riprap stone.....do....	10,462.0	1.30	13,600.60
Concrete blocks.....cubic yards..	433.1	9.90	4,287.69



## COMMERCIAL STATISTICS.

The following statistics for the year 1904, relative to the commerce of the harbor of Conneaut, Ohio, were compiled from information furnished by the collector of customs and others:

Receipts.	Tons.	Shipments.	Tons.
Iron ore.....	4,083,655	Coal.....	404,227
Pier stone.....	52,104	Steel rails.....	1,591
Miscellaneous merchandise.....	459	Splice bars.....	32
		Steel plates, etc.....	4,571
		Steel billets.....	731
		Miscellaneous merchandise.....	1,168
<b>Total.....</b>	<b>4,136,218</b>	<b>Total.....</b>	<b>412,320</b>

## Total freight tonnage:

1904.....	4,548,538
1903.....	5,296,991

Decrease.....	748,453
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Vessels.	Number.	Tonnage.
Entering.....	1,271	2,797,511
Departing.....	1,308	2,806,706

## Total registered tonnage:

1904.....	5,604,217
1903.....	6,193,754

Decrease.....	589,537
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Draft of largest vessels using harbor, 20 feet.  
Largest vessels do not load to full depth.  
No new vessel lines established during the year.

## REPORT OF MR. HOWARD E. SMITH, ASSISTANT ENGINEER.

ASHTABULA, OHIO, *June 30, 1905.*

COLONEL: I have the honor to submit the following report of operations at Conneaut Harbor, Ohio, for the fiscal year ending June 30, 1905:

A contract is in force with the Donnelly Contracting Company for constructing parts of the east and west breakwaters and for extending and reconstructing parts of the east and west piers. The original contract is dated November 14, 1902, and supplemental agreements are dated December 14, 1903, and February 6, 1904. Work under this contract was begun April 14, 1903.

*Pier work.*—The cribs comprising the subaqueous portion of the new section of the east and west piers had all been placed during the preceding fiscal year, and the opening of the present year found the contractors actively engaged in building up the concrete superstructures. In this portion of the work their energy and care were most commendable. About 815 linear feet of superstructure were completed before the close of the season of 1904, requiring 3,400 cubic yards of concrete.

The removal of the wooden superstructure of the old 400-foot section of west pier was started September 30, and by the close of the season about all the material had been removed to water level. Forty linear feet of old pier were leveled up and otherwise made ready to receive the concrete blocks that comprise the lower portion of the new concrete superstructure. The contractors began to sheathe this same section of old west pier September 16, and completed the work October 26.

Between the dates October 24 and October 28 a force of men, under direction of a



Item.	Quantity.	Unit price.	Value at contract price.
Timber crib and concrete (east) breakwater—Continued.			
Concrete in mass .....cubic yards..	1,246.3	\$7.00	\$8,724.10
Crib structures (exclusive of stone filling).....			36,354.82
Timber crib (west) breakwater:			
Small riprap stone .....tons..	4,716.0	1.35	6,366.60
Heavy riprap stone .....do....	897.0	1.65	1,480.05
Pine timber .....feet B. M..	76,655.0	40.00	3,066.20
Oak timber .....do....	8,240.0	50.00	412.00
Hard-wood sheathing.....do....	4,116.0	42.00	172.87
Drift bolts .....pounds..	8,488.0	.04	339.52
Lag screws and washers.....do....	2,523.0	.04	100.92
Screw bolts and washers.....do....	4,109.0	.04	164.36
Tie rods and washers.....do....	5,095.0	.04	203.80
Spikes .....do....	1,050.0	.04	42.00
Crib structures (exclusive of stone filling).....			10,807.49
Two pierheads:			
Small riprap stone .....tons..	3,537.0	1.33	4,704.21
Heavy riprap stone .....do....	1,127.5	1.65	1,860.38
Crib structures (exclusive of stone filling).....			13,216.16
Total value of work done during fiscal year ending June 30, 1905.....			144,438.97

General progress.

Item.	Total to June 30, 1905.		Total required.		Per cent completed.
	Quantity.	Price.	Quantity.	Price.	
Timber crib and concrete piers.					
Dredging.....cubic yards..	66,020.0	\$19,145.80	66,020.0	\$19,145.80	100.0
Old pier removed.....linear feet..	518.0	2,590.00	518.0	2,590.00	100.0
Small riprap stone.....tons..	20,597.5	27,394.68	21,760.0	28,940.80	94.6
Old pile revetment removed.....linear feet..	412.0	2,472.00	412.0	2,472.00	100.0
Rock and shale removed.....cubic yards..	280.0	434.00	280.0	434.00	100.0
Heavy riprap stone.....tons..	1,141.0	1,882.65	1,141.0	1,882.65	100.0
Concrete blocks.....cubic yards..	1,891.8	18,918.00	3,168.6	31,686.00	59.7
Mass concrete.....do....	5,016.1	37,119.14	8,459.6	62,601.04	59.2
Crib structures.....		74,550.52		74,550.52	100.0
Oak fenders.....M feet..			22,248.0	1,112.40	
Bolts, washers, and collars.....pounds..			10,440.0	417.60	
Hemlock timber.....M feet..	3,127.0	203.25	20,000.0	1,300.00	15.6
Hard-wood sheathing.....do....	26,771.0	3,319.60	80,000.0	9,920.00	33.4
Lag screws and washers.....pounds..	10,409.0	416.36	94,430.0	3,777.20	11.0
Old superstructure removed.....linear feet..	40.0	160.00	997.0	3,988.00	1.0
Driftbolts.....pounds..	469.0	18.76	6,000.0	240.00	7.8
Spikes.....do....	13.0	.52	300.0	12.00	4.3
Timber crib breakwater:					
Heavy riprap stone.....tons..	1,425.0	2,351.25	1,425.0	2,351.25	100.0
Small riprap stone.....do....	5,960.0	8,046.00	5,960.0	8,046.00	100.0
Crib structures.....		10,807.49		10,807.49	100.0
Pine timber.....M feet..	76,655.0	3,066.20	76,655.0	3,066.20	100.0
Screw bolts and washers.....pounds..	4,109.0	164.36	4,109.0	164.36	100.0
Driftbolts.....do....	8,488.0	339.52	8,488.0	339.52	100.0
Lag screws and washers.....do....	2,523.0	100.92	3,227.0	129.08	78.1
Spikes.....do....	1,050.0	42.00	1,050.0	42.00	100.0
Tie-rods and washers.....do....	5,095.0	203.80	5,095.0	203.80	100.0
Oak timber.....M feet..	8,240.0	412.00	8,240.0	412.00	100.0
Hard-wood sheathing.....do....	4,116.0	172.87	4,116.0	172.87	100.0
Timber crib and concrete breakwater:					
Heavy riprap stone.....tons..	5,289.0	8,462.40	5,289.0	8,462.40	100.0
Small riprap stone.....do....	13,922.0	18,098.60	15,300.0	19,890.00	91.0
Crib structures.....		36,354.82		36,354.82	100.0
Concrete blocks.....cubic yards..	433.1	4,287.69	1,085.0	10,741.50	39.9
Mass concrete.....do....	1,246.3	8,724.10	3,500.0	24,500.00	35.6
Oak fenders.....M feet..			1,152.0	57.60	
Bolts, washers, and collars.....pounds..			2,820.0	100.11	
Two pierheads:					
Heavy riprap stone.....tons..	1,735.0	2,862.76	1,735.0	2,862.76	100.0
Small riprap stone.....do....	3,831.0	5,095.23	5,800.0	7,714.00	66.0
Concrete blocks.....cubic yards..			400.0	4,000.00	
Mass concrete.....do....			760.0	5,510.00	
Paving stone.....tons..			120.0	600.00	
Oak fenders.....M feet..			2,100.0	105.00	
Bolts, washers, and collars.....pounds..			1,200.0	48.00	
Iron pipe.....do....			600.0	300.00	
Crib structures.....		13,216.16		13,216.16	100.0
Total.....		311,423.45		405,266.93	76.8

Work under this contract was suspended November 26, 1904, and shortly afterwards there came the report that the contractors had become involved financially. No work has been done by the contractors the present season up to the close of the fiscal year.

*Surveys of, and restoration of the channel.*—Surveys of channel were made as usual in December, 1904, and again in March, 1905. There was no marked change in the condition of the channel due to the winter's storms, and at opening of navigation in the spring loaded vessels were able to enter the harbor without difficulty.

The emergency spring dredging was accomplished by the new U. S. dredge *Burton*. The work was started May 1 and was completed May 19. Fourteen thousand cubic yards of material were removed.

*Wrecks.*—The steam car ferry *Shenango, No. 1*, which was destroyed by fire March 11, 1904, and then sunk outside the harbor, as stated in my last annual report, has not yet been removed, but the wreck is properly marked with buoy and lantern. Mr. George W. Pfohl, to whom was awarded the contract for the removal of wreck, at the opening of the present fiscal year was engaged in this work and continued until about August 1, 1904, after which nothing was done. The five or six steel gondola cars removed from the wreck by him were so badly twisted by the fire as to have no value except for old iron. After being granted an extension of time Mr. Pfohl was finally relieved of the contract at his own request, and his bond was forfeited. Three bids were received under advertisement in May, 1905, but at this time the contract has not been awarded.

Very respectfully,

HOWARD E. SMITH,  
*United States Assistant Engineer.*

Lieut. Col. DAN C. KINGMAN,  
*Corps of Engineers.*

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## P P II.

### REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

*Tow barge L. L. Lamb.*—On the night of August 16, 1902, the tow barge *L. L. Lamb* foundered and sank about a mile northwest of the Fairport Harbor light. This vessel was loaded at the time with 410 tons of large stone intended for use in improving the harbor at Ash-tabula, Ohio. The various operations for the removal of this wreck were reported on pages 3206 and 3207, Report of Chief of Engineers, 1904. The wreck was completely disposed of before the close of the fiscal year, but the cost of the work had not been determined and the final payments were not made until the present fiscal year.

The original allotment for the removal of this wreck was \$1,500. The balance available July 1, 1904, was \$1,439.47; the amount expended in removing the wreck was \$150, and the balance, \$1,289.47, was redeposited to the credit of the Treasurer of the United States.

*Yacht Idler.*—On the 23d of March, 1904, the yacht *Idler* sank off the entrance of Fairport Harbor, Ohio, about 300 feet beyond the end of the jetties. It was in a position where it would endanger navigation. It was completely broken up and removed by the U. S. dredge *Maumee*, as described in the Annual Report of the Chief of Engineers, pages 3208 and 3209. All the operations for removing the wreck were accomplished before the close of the fiscal year 1904. An allotment of \$375 was made to cover the expense of the removal and payment was made during the present year.

*Schooner General Franz Sigel.*—This vessel was a three-masted schooner; gross tonnage, 316; length, 136.8 feet; breadth, 25.8 feet; depth, 11.5 feet, and was built in 1862 at Black River, Ohio. The vessel was loaded with coal and foundered and sank in Lake Erie near Stoney Point on the 18th of July, 1903. The wreck was visited and examined in the fall of 1903 by the United States survey boat, and an allotment of \$2,500 was made for its removal. On the 19th of July, 1904, the U. S.

dredge *Maumee* was taken to the wreck and employed until the end of the month in its removal. Dynamite was used to break up the hull. The coal which formed its cargo was dredged up in part and deposited on a scow and the fragments of the hull were towed ashore and disposed of. The coal that was saved was sold at public auction for \$255.50.

The cost of removing the wreck was \$1,406.60, and the balance of the allotment, together with the proceeds of the sale of salvage, amounting in all to \$1,408.90, was redeposited in the Treasury to the credit of the United States.

*Car ferry Shenango No. 1.*—On the 29th of March, 1904, the steam car ferry *Shenango No. 1* burned and sank outside the harbor of Conneaut, Ohio. It contained 26 empty gondola cars. The wreck lay in about 24 feet of water at the stern and 18 feet at the bow. Its position was such as to make it a danger to navigation. Two thousand five hundred dollars was allotted for its removal. Proposals were invited by advertising for thirty days, and a contract was awarded to George W. Pfohl, of Buffalo, N. Y., who undertook to remove the wreck for the salvage and without cost to the United States. He made some progress upon the work and removed several of the cars. The time of completing his contract was extended at his request, but in the spring of 1905 he wrote a letter declaring that he could not remove the wreck and that he abandoned the contract. The contract was accordingly annulled and the work was readvertised. The lowest bid received at the time of opening the proposals was that of Charles W. Johnston, of Lewes, Del., whose price was \$4,900. His proposal was accepted and another allotment of \$3,000 was made to carry out the work. When the contracts were sent to Mr. Johnston he declined to sign them. He declared that the work was much more difficult than he had supposed at the time of making his proposal, and that he could not carry it out. The next lowest bidder was Van Sant & Boehm, of Atlantic City, N. J., whose price was \$9,800. Another allotment of \$5,000 has been made for the work, and contracts have been sent to these parties for signature. They have not yet been heard from.

*Steamer Philip Minch.*—The steamer *Philip Minch* was burned and sank off Sandusky Harbor on the night of November 19, 1904. Search was made for it by the United States survey boat, and it was finally discovered on November 28. This steamer was a wooden vessel, built in Cleveland, Ohio, in 1888. It was 276 feet long, 40.8 feet wide, and 22 feet deep. Nothing showed of the wreck except a floating spar held by the rigging. The sea was too rough to permit it to be carefully examined, but it was buoyed and its location fixed by ranges and angles. Its general location may be described as follows:

It lies in 45 feet of water on a course E.  $\frac{1}{4}$  N. from Middle Island light-house, 8.6 miles; N.  $\frac{1}{4}$  E. from Huron piers, 19.25 miles; NNE.  $\frac{3}{4}$  E. from Sandusky outer can buoy, 15 miles; S. by E.  $\frac{1}{4}$  E. from Pelee Passage light, 11.25 miles.

On June 29, 1905, the wreck was again visited and found by the aid of the sextant angles. A barrel buoy, painted red and black, was placed to mark the south end of the wreck, but the wreck itself could not be thoroughly examined on account of the sea. Twenty-seven feet of water was found over what appeared to be the boiler. In one sweep something was felt at 22 feet, but apparently this was simply a loose timber. The wreck will be examined again as soon as possible, and if it appears to be an obstruction to navigation an allotment will be asked for for its removal.

## APPENDIX Q Q.

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### IMPROVEMENT OF ERIE HARBOR, PENNSYLVANIA, AND OF CERTAIN RIVERS AND HARBORS IN WESTERN NEW YORK.

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#### REPORT OF COL. H. M. ADAMS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905, WITH OTHER DOCUMENTS RELATING TO THE WORKS.

##### IMPROVEMENTS.

- |  |  |
|--|--|
| 1. Erie Harbor, Pennsylvania.  | 6. Black Rock Harbor and Channel, New York.      |
| 2. Dunkirk Harbor, New York.   | 7. Tonawanda Harbor and Niagara River, New York. |
| 3. Buffalo Harbor, New York.   |  |
| 4. Lake Erie entrance to Black Rock Harbor and Erie Basin, New York. |  |
| 5. Buffalo entrance to Erie Basin and Black Rock Harbor, New York.   |  |
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UNITED STATES ENGINEER OFFICE,  
*Buffalo, N. Y., July 3, 1905.*

GENERAL: I have the honor to forward herewith reports of operations \* \* \* on river and harbor works \* \* \* during the year ending June 30, 1905.

Very respectfully, your obedient servant,

H. M. ADAMS,  
*Colonel, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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## Q Q I.

### IMPROVEMENT OF ERIE HARBOR, PENNSYLVANIA.

#### REPORT OF OPERATIONS.

Minor repairs to Jetty No. 2, outer shore of Presque Isle peninsula, which was damaged by the storm of September 24, 1904, were made October 12-15, 1904, 34 linear feet of deck plank and 1 cubic yard of filling stone being replaced, at a cost of \$9.25. No other work on structures was done during the fiscal year.

The sum of \$125,000 was appropriated by the river and harbor act of March 3, 1905, and project for the expenditure of these funds was forwarded and approved.

Under this project contracts were made with the Lake Erie Dredging Company, Buffalo, N. Y., after due advertisement, for channel and basin excavation, and with William H. Shelton, of Dunkirk, N. Y., for extension of south pier and concrete superstructure on north pier.

Work under the contract with the Lake Erie Dredging Company was fairly started at the close of the fiscal year, and preparatory work had been done under the contract with William H. Shelton.

#### CONDITION OF THE WORKS.

The north pier is in good condition, except 750 linear feet of timber-crib pier which was built prior to 1883. This portion is badly decayed, and reconstruction of the superstructure with concrete will be done with funds now available.

The south pier is in good condition, and will be extended 500 feet with funds now available.

The entrance channel and harbor basin are in fair condition. Dredging of the basin will be finished and the channel made the required depth of 20 feet and width of 300 feet with funds now available.

The preservation of the peninsula is of vital importance to Erie Harbor, and it is for the purpose of preserving the harbor that the protection of the weak parts of the peninsula has been deemed necessary. The weakest portion is the long, narrow neck at the western end, and works of protection have been constructed to prevent a breach through this narrow neck. The danger exists during severe storms from the westward.

The protection works for the neck consist of the remains of a shore protection constructed in 1889, which affords little or no protection, and the tree growth propagated and maintained on the neck. During 1896-1898 about 6,600 young locust and willow trees were planted on the neck of the peninsula. Most of these have grown finely and now furnish a permanent and living protection to this neck.

The beach erosion along the body of the peninsula has been corrected to some extent by jetties, built out from the shore. At the present time there is one dilapidated jetty at the easterly end, no longer of service, and three jetties about the middle of the peninsula shore.

#### PROPOSED OPERATIONS AND REMARKS.

The river and harbor act of March 3, 1899, officially adopts a new and extended project for the improvement of Erie Harbor. This is in accordance with the report from this office, with map, in House Executive Document No. 70, Fifty-fifth Congress, first session, and without map in the Report of the Chief of Engineers for 1897, page 3238. This new project is summarized as follows:

- (1) To repair and keep in repair existing structures.
- (2) To extend the north pier 500 feet.
- (3) To extend the south pier 1,000 feet.
- (4) To dredge the entrance channel to a depth of 20 feet.
- (5) To dredge a portion of the eastern end of the bay, needed for access to docks, to a depth of 20 feet.
- (6) To build four protection jetties along the outside of Presque Isle peninsula.
- (7) To maintain existing structures on and care for Presque Isle peninsula.



The estimated cost of the project is \$377,000, which, however, does not include items 1 and 7, except as specially estimated for at the time the project was adopted.

It is estimated that \$62,000 can be profitably expended during the next fiscal year in work under the project, viz, to extend the south pier 500 feet and to build one projection jetty on the outside of Presque Isle peninsula. There will be required in addition the sum of \$8,000 for general maintenance, making the total amount that should be appropriated \$70,000.

*Money statement.*

July 1, 1904, balance unexpended .....	\$28,222.46
Amount appropriated by river and harbor act approved March 3, 1905..	125,000.00
Received from sales.....	6.00
	<hr/>
	153,228.46
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	3,288.42
	<hr/>
July 1, 1905, balance unexpended .....	149,940.04
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	112,927.50
	<hr/>
Amount (estimated) required for completion of existing project .....	62,000.00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement.....	\$62,000.00
For maintenance of improvement.....	8,000.00
	<hr/>
	70,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

STATEMENT OF APPROPRIATIONS AND ALLOTMENTS.

1823 .....	\$150.00	1871 (allotment) .....	\$10,000.00
May 26, 1824 .....	20,000.00	June 10, 1872 .....	15,000.00
May 25, 1826 .....	7,000.00	June 23, 1874 .....	20,000.00
March 2, 1827 .....	2,000.00	March 3, 1875 .....	80,000.00
May 19, 1828 .....	6,223.18	August 14, 1876 .....	40,000.00
March 3, 1829 .....	7,390.25	June 16, 1878 .....	25,000.00
March 2, 1831 .....	1,700.00	March 3, 1879 .....	25,000.00
July 3, 1832 .....	4,500.00	June 14, 1880 .....	25,000.00
March 2, 1833 .....	6,000.00	March 3, 1881 .....	20,000.00
June 28, 1834 .....	23,045.00	August 2, 1882 .....	20,000.00
March 3, 1835 .....	5,000.00	July 5, 1884 .....	50,000.00
July 2, 1836 .....	15,122.80	August 5, 1886 .....	37,500.00
March 3, 1837 .....	15,000.00	August 11, 1888 .....	83,000.00
July 7, 1838 .....	30,000.00	September 19, 1890 .....	40,000.00
June 11, 1844 .....	40,000.00	1891 (received from sales) ..	4,716.89
August 30, 1852 .....	30,000.00	July 13, 1892 .....	40,000.00
1864 (allotment) .....	15,000.00	August 18, 1894 .....	10,000.00
June 23, 1866 .....	36,961.00	March 3, 1899 .....	125,000.00
March 2, 1867 .....	25,000.00	June 13, 1902 .....	125,000.00
1868 (allotment) .....	40,000.00	March 3, 1905 .....	125,000.00
1869 (allotment) .....	22,275.00	1904 (received from sales) ..	6.00
June 11, 1870 .....	20,000.00		
March 3, 1871 .....	29,000.00	Total .....	1,321,590.12

CONTRACTS IN FORCE.

*For channel and basin excavation in Erie Harbor, Pennsylvania, dated May 25, 1905.*

Name of contractor: The Lake Erie Dredging Company, Buffalo, N. Y.  
Rates: Excavation in entrance channel, per cubic yard, scow measure, 23 cents;  
excavation in harbor basin, per cubic yard, place measure, 25 cents.  
Date of approval: June 8, 1905.  
Date of commencement: June 13, 1905.  
Date of expiration: October 31, 1906.

*For extending south pier and concrete superstructure on north pier at Erie Harbor, Penn-  
sylvania, dated June 8, 1905.*

Name of contractor: Wiliiam H. Shelton, Dunkirk, N. Y.  
Rates: Extending south pier:  
Dredging for foundation, per cubic yard, scow measure ..... \$0. 40  
Foundation stone, per cubic yard..... 2. 00  
Riprap stone, per cubic yard..... 3. 00  
Timber cribs filled with stone and leveled, per linear foot..... 36. 55  
Concrete blocks, per cubic yard ..... 10. 95  
Filling stone in superstructure, per cubic yard..... 2. 00  
Mass concrete, per cubic yard ..... 8. 95  
Manhole covers, per cover ..... 4. 50  
Concrete superstructure on north pier:  
Removing old superstructure, per linear foot ..... 7. 50  
New hemlock timber above 4 feet below mean lake level, per 1,000 feet B. M. 65. 00  
New hemlock timber below 4 feet below mean lake level, per 1,000 feet B. M. 100. 00  
New white-oak piles, per pile ..... 7. 00  
New stone filling in concrete superstructure. per cubic yard..... 2. 50  
Concrete blocks set in place, per cubic yard ..... 10. 95  
Concrete blocks molded in place, per cubic yard ..... 9. 25  
Mass concrete in place, per cubic yard ..... 8. 95  
Manhole covers, per cover ..... 4. 50  
Mooring posts, per post..... 22. 50  
White-oak fenders, per fender..... 4. 65  
Date of approval: June 15, 1905.  
Date of commencement: July 17, 1905.  
Date of expiration: June 30, 1907.

COMMERCIAL STATISTICS OF ERIE HARBOR, PENNSYLVANIA.

*Arrivals and departures of vessels for the year ending December 31, 1904.*

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Num- ber.	Tons.	Num- ber.	Tons.	Num- ber.	Tons.	Num- ber.	Tons.
Steam.....	799	1, 811, 568	70	28, 804	811	1, 270, 717	69	33, 994
Sail and barges .....	101	120, 929	81	17, 119	81	85, 188	84	21, 912
Total.....	900	1, 432, 497	101	46, 013	892	1, 355, 905	103	55, 906

Total arrivals and departures:  
Number..... 1, 996  
Tonnage ..... 2, 890, 321  
Decrease of tonnage, 1904 under 1903 ..... tons.. 633, 307  
Amount of revenue collected, year 1904:  
Lake commerce..... \$12, 513  
Rail commerce ..... \$28, 100  
Value of imports:  
Lake ..... \$146, 474  
Rail..... \$134, 931  
Value of exports, lake ..... \$97, 008  
Enrolled tonnage, port of Erie, Pa ..... net tons.. 37, 583  
Greatest draft of vessels..... feet.. 19



Receipts and shipments by lake.

RECEIPTS.

[Tons of 2,000 pounds.]

	1899.	1900.	1901.	1902.	1903.	1904.
Merchandise.....	123,262	40,376	42,020	78,342	89,141	82,168
Barley.....	2,119	.....	225	2,277	6,863	4,776
Corn.....	147,881	235,940	840	841	95,849	10,917
Oats.....	2,575	.....	.....	.....	.....	.....
Rye.....	10,417	.....	.....	.....	10,233	8,501
Wheat.....	15,287	39,521	50,146	44,162	33,583	29,858
Flaxseed.....	23,475	9,622	9,785	.....	.....	.....
Flour.....	192,824	104,757	118,776	180,982	166,631	84,790
Lumber.....	13,539	14,306	15,740	23,085	17,908	21,012
Laths.....	63	.....	225	77	115	124
Poles and stave bolts.....	520	.....	.....	.....	12	80
Ties.....	.....	.....	.....	.....	732	.....
Iron ore.....	1,467,204	1,670,465	1,518,099	1,984,983	1,257,798	1,467,805
Copper.....	29,241	16,267	18,104	5,465	12,975	6,655
Lead.....	8,865	508	1,170	2,239	2,973	1,244
Limestone.....	26,812	.....	.....	.....	2,700	.....
Plaster and cement.....	700	.....	.....	.....	.....	.....
Fish.....	.....	.....	8,300	.....	8,800	4,009
Pulp wood.....	14,684	40,431	22,618	32,400	16,988	9,225
Total.....	2,073,868	2,172,193	1,806,048	2,304,808	1,718,301	1,726,164

SHIPMENTS.

Anthracite coal.....	787,719	725,101	519,974	154,432	291,642	233,507
Bituminous coal.....	537,600	405,741	530,738	660,202	533,586	458,044
Pig and manufactured iron..	113	416	38	1,079	642	.....
Merchandise.....	137,171	58,905	59,475	105,447	118,788	97,752
Total.....	1,412,603	1,185,163	1,110,225	921,160	944,658	784,308

About 15,000 passengers arrive and depart by water annually.

Q Q 2.

IMPROVEMENT OF HARBOR AT DUNKIRK, NEW YORK.

REPORT OF OPERATIONS.

No work was done upon the harbor structures nor channels during the fiscal year.

An examination made May 27, 1905, showed that about 50 deck planks on the west pier were in bad condition, and preparations were made for renewing them.

CONDITION OF THE WORKS.

The west pier is in good condition except two old timber sections, one 110 feet long and one 266 feet long.

The breakwater is intact, but the old part, 1,341 feet long, is much decayed.

PROPOSED OPERATIONS AND REMARKS.

The work outlined in the adopted project for Dunkirk Harbor has been completed, and the harbor is ready for use.

It is proposed with the money on hand to maintain the structures and channel as far as funds will permit.

The commerce of Dunkirk is small and is not increasing.

Money statement.

July 1, 1904, balance unexpended.....	\$22,029.38
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	16.85
July 1, 1905, balance unexpended .....	22,012.53

STATEMENT OF APPROPRIATIONS AND ALLOTMENTS.

March 27, 1827 .....	\$3,000.00	March 3, 1873.....	\$48,132.95
May 19, 1828.....	6,000.00	June 23, 1874 .....	35,000.00
March 3, 1829.....	9,812.75	March 3, 1875.....	35,000.00
April 23, 1830.....	1,342.75	August 14, 1876 .....	18,000.00
March 2, 1831.....	7,102.50	1879 .....	2,500.00
July 3, 1832.....	10,200.00	June 14, 1880 .....	10,000.00
June 28, 1834 .....	4,000.00	July 5, 1884.....	10,000.00
March 3, 1835 .....	10,988.43	August 5, 1886 .....	20,000.00
July 2, 1836.....	11,000.00	August 11, 1888 .....	15,000.00
March 3, 1837.....	15,000.00	September 19, 1890 .....	20,000.00
July 7, 1838.....	10,000.00	July 13, 1892.....	20,000.00
June 11, 1844 .....	5,000.00	August 18, 1894 .....	20,000.00
August 30, 1852 .....	30,000.00	June 3, 1896 .....	10,000.00
March 2, 1867.....	100,000.00	June 22, 1896 (repayment) ..	250.00
1869 .....	2,000.00	June 4, 1897 .....	398,258.00
July 11, 1870.....	25,000.00	June 13, 1902 .....	25,000.00
March 3, 1871.....	25,000.00		
June 10, 1872 .....	25,000.00	Total .....	987,587.38

COMMERCIAL STATISTICS FOR DUNKIRK HARBOR, NEW YORK.

Arrivals and departures of vessels for the year ending December 31, 1904.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.
Steam.....	54	2,179	.....	.....	61	2,355	1	12
Sail and barge .....	1	582	.....	.....	.....	.....	.....	.....
Total.....	55	2,761	.....	.....	61	2,355	1	12

Total arrivals and departures.....	117
Tonnage .....	5,128
Decrease of tonnage, 1904 under 1903.....	tons.. 59,675
Amount of revenue collected for the year 1904: Rail .....	\$8,348.10
Value of imports: Rail.....	\$24,508.00
Receipts by lake: Lumber.....	tons.. 3,324
Enrolled tonnage, port of Dunkirk, N. Y.....	gross tons.. 607
Greatest draft of vessels .....	feet.. 16

Q Q 3.

IMPROVEMENT OF BUFFALO HARBOR, NEW YORK.

REPORT OF OPERATIONS.

Minor repairs to the old timber crib breakwater, consisting of replacing decayed deck planks and wall timbers, were begun August 15, and completed September 12, 1904, at a cost for materials and labor of \$229.40.

An examination of the north end of this breakwater showed the sub-

structure to be in bad condition, and a contract was made September 17, 1904, with James B. Donnelly for riprapping it. Work under this contract was begun October 11 and finished December 17, 1904, 4,982.7 tons of stone being placed at a total cost of \$11,460.21, making this exposed end of the breakwater secure for the present from further damage.

The timber portion of the south harbor section of breakwater was damaged by storm December 27–28, 1904. The parapet and middle (sloping) decks were badly broken up for a length of 180 feet, and the adjoining 180 feet was twisted and out of alignment and some of the timbers broken. This damage will be repaired during the next fiscal year.

The river and harbor act of March 3, 1905, appropriated \$150,000 for maintenance at Buffalo Harbor.

Under this appropriation contracts have been made for replacing with concrete 336 feet of timber superstructure on the south pier at the Buffalo River entrance, which work was fairly started at the close of the fiscal year, and for dredging the channel between the piers and outward to the Buffalo light and fog-signal station, which work will be begun as soon as possible.

Bids were invited and received for repairing the damaged South Harbor section and providing it with a stone superstructure and sea slope.

The inspection steamer *Gen. John M. Wilson* was on duty throughout the year on the inspection of operations on harbor works, on the care of floating plant, and on the enforcement of laws for the protection of navigation, notably the dumping of dredgings.

A watchman was on duty throughout the year at the United States engineer storehouse on the south pier, for the care of public property, and he also acted as ferryman for employees and supplies to and from the storehouse, and had charge of the automatic water gauge.

The north pier at the entrance to Buffalo River, occupied by the Delaware, Lackawanna and Western Railroad Company, is the only one of the Government harbor works permanently occupied by corporations or private parties.

The occupancy was begun in 1878. A history of this occupancy and copies of official documents relating thereto are given in the Report of the Chief of Engineers for 1889, pages 2373–2383, and in the Report for 1898, page 2775 et seq.

#### CONDITION OF THE WORKS.

At the close of the fiscal year the condition of the works was as follows:

*Entrance channel and piers.*—These works, forming the entrance to the inner harbor, which comprises Buffalo Creek and the city ship canal, were in fair condition.

The north pier remains in possession of the Delaware, Lackawanna and Western Railroad Company, and is kept in repair by that corporation.

The south pier was rebuilt with concrete from its inner end to the Buffalo light, 1,425 feet, in 1900–1901, and placed in a permanent condition. The remainder of this pier, 350 feet long at the outer end, is

a timber-crib, stone-filled pier, built over thirty years ago, and its reconstruction is now in progress.

*Breakwater system.*—This system comprises four sections of breakwater separated by three entrance channels.

The north breakwater, 2,200 feet long, is a permanent concrete structure and is in good condition. This section was built under a special project, but is essentially a link in the breakwater system.

The old breakwater is 7,608 feet long, of which 4,894 feet is in permanent concrete form and 2,714 feet is timber cribwork.

The south harbor breakwater is 9,989 feet long. This is a part of the breakwater extension to Stony Point and is fully completed as specified under the contracts for that work. The northerly 7,250 feet is of rubblestone type, a permanent form, and at the close of the fiscal year was fully completed.

Of the remaining 2,739 feet of this section of breakwater, 1,800 feet is of timber-crib-concrete type, and 939 feet is of the original timber-crib type.

The Stony Point breakwater is 2,803 feet long, connecting with the shore, and is of timber-crib type.

The outer harbor basin is in good condition, with a depth of water generally 20 to 28 feet deep at mean lake level outside of the harbor line, except at the south end at the entrance to the Lackawanna Steel Company and the Buffalo and Susquehanna Iron Company's canals, where there is an area 15 to 20 feet deep at mean lake level, except along the harbor line generally where the depth is 16 to 18 feet.

A detailed statement of the condition of the breakwater structures is given in a report now in preparation on a "Survey of Buffalo breakwater with a view to ascertaining what modifications, if any, are required," and no estimate is made in this report for work on these structures, except for emergency repairs, pending action on the report.

#### PROPOSED OPERATIONS AND REMARKS.

The sundry civil act of March 3, 1905, appropriated \$143,506 for Buffalo Harbor, "continuing improvement," and letter from the Chief of Engineers of March 9, 1905, stated that "the work contemplated in connection with continuing improvement of Buffalo Harbor is that for protection of the portion of the harbor now injuriously affected by waves through the opening in the breakwater at South Buffalo."

A project was accordingly submitted and approved for building an extension of the Stony Point section of the breakwater, to be of stone similar to the stone breakwater already built, 1,000 feet long, running in a northwesterly direction from the north end of the present Stony Point section at an angle of 150° from the axis of said section.

It is proposed to raise this to a height of 12 feet below mean lake level with stone now being excavated from Lake Erie entrance to Black Rock Harbor and Erie Basin under contract with the Buffalo Dredging Company, which contract obligates them to deposit the excavated stone where required, "between Woodlawn Beach and Grand Island." After being raised to the height stated, the balance of the proposed structure will be built under contract.

The prices bid for stone this season, under nearly similar conditions, indicate that the total cost of this structure will be \$204,884.50, and as the amount available from the present appropriation is \$130,000,

a further appropriation will be required to complete it, amounting to \$74,819.50, or, adding 7 per cent for engineering and office expenses, in round numbers, \$80,000.

The final reenforcement of the breakwater extension to Stony Point is important and very urgent. It is plainly apparent that the entire lake front of the timber-crib-concrete portion of the breakwater system must be provided with a sea slope laid to the lines and capped with large capping stones in all respects similar to the sea slope of the stone breakwater adjoining it. The reenforcement of the toe of the harbor wall of the stone breakwater is also considered necessary to insure the absolute stability of that structure.

As before stated, no estimate is made for this work, pending action on report of survey now in preparation.

As the Government has over 4 miles of breakwater at this port, besides the entrance piers, there is evident likelihood that considerable sums may be required for their maintenance until all have been placed in a permanent form. The Government has assumed charge of the entrance channel to the extent of keeping it dredged out to the requisite depth for the large vessels trading here. The moving sands and currents tend to shoal this channel, which must be dredged out periodically.

Dredging will also be required in parts of the outer harbor basin as the demands of commerce increase. At the present time such dredging is needed to deepen the entrance to the canals of the Lackawanna Steel Company and the Buffalo and Susquehanna Iron Company at Stony Point to 23 feet at mean lake level, and dredging will be required at other points along the harbor line as the commerce of the outer harbor develops. Such dredging is not now specifically provided for and defined in the project for improvement of Buffalo Harbor.

It is estimated that \$15,000 will be required for widening the main entrance channel outside the piers to 400 feet, and that \$20,000 will be required for general and emergency maintenance of structures and channels and for contingencies during the fiscal year 1907, making the total amount recommended as follows:

Continuing improvement:

For completing the extension of the Stony Point section..... \$80,000

Maintenance:

For widening the main entrance channel outside the piers to 400 feet... 15,000

For general and emergency maintenance of structures and channels.... 20,000

Total ..... 115,500

For many years past the need of a storage ground, work yard, and slip for loading and unloading timber and other materials used in harbor construction has been apparent. The Government has no place for storage and dockage of this character, and the rental of property for the purpose is not feasible nor desirable in a crowded port like Buffalo.

Plans and estimates for such a work yard and slip have been made from time to time. The estimated cost of the work would be \$73,600.

The reasons and necessities for this improvement are fully set forth in the Annual Report of the Chief of Engineers for 1903, page 2135 et seq.

It is recommended that the project for the improvement of Buffalo Harbor be extended so as to provide for the proposed work yard and slip at the estimated cost of \$73,600.

*Money statement.*

July 1, 1904, balance unexpended .....	\$27,763. 24
Amount appropriated by river and harbor act approved March 3, 1905..	150,000. 00
Amount appropriated by sundry civil act approved March 3, 1905 .....	143,506. 00
Amount received from sales.....	46. 00
	<hr/>
	321,315. 24
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	20,787. 17
	<hr/>
July 1, 1905, balance unexpended .....	300,528. 07
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	25,746. 60
	<hr/>
Amount (estimated) required for completion of existing project.....	80,000. 00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement.....	\$80,000. 00
For maintenance of improvement .....	35,000. 00
	<hr/>
	115,000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

STATEMENT OF ALLOTMENT AND APPROPRIATIONS.

May 26, 1826 .....	\$15,000. 00	June 18, 1878.....	\$80,000. 00
May 19, 1828.....	34,206. 00	March 3, 1879 .....	100,000. 00
April 23, 1830 .....	15,488. 00	June 14, 1880.....	90,000. 00
March 2, 1831 .....	12,900. 00	March 3, 1881 .....	90,000. 00
July 3, 1832 .....	10,300. 00	August 2, 1882 .....	125,000. 00
March 2, 1833 .....	31,700. 00	July 5, 1884 .....	100,000. 00
July 28, 1834.....	20,000. 00	August 5, 1886 .....	112,500. 00
July 7, 1838.....	68,500. 00	August 11, 1888 .....	225,000. 00
June 11, 1844.....	40,000. 00	September 19, 1890 .....	300,000. 00
August 30, 1852.....	14,000. 00	July 13, 1892.....	300,000. 00
March 3, 1853 .....	349. 05	August 18, 1894 .....	70,000. 00
March 2, 1855 .....	452. 32	June 4, 1897 .....	481,250. 00
June 28, 1864 .....	15,000. 00	July 1, 1898.....	489,746. 00
July 2, 1864 .....	37,500. 00	March 3, 1899 .....	485,498. 00
June 23, 1866.....	131,000. 00	March 3, 1899 .....	75,000. 00
March 2, 1867 .....	100,000. 00	March 3, 1901 .....	400,000. 00
April 10, 1869 .....	89,100. 00	June 13, 1902 .....	30,000. 00
July 10, 1870 .....	80,000. 00	June 28, 1902 .....	200,000. 00
March 3, 1871 .....	100,000. 00	April 9, 1904 (sales).....	750. 00
June 10, 1872 .....	75,000. 00	March 3, 1905.....	150,000. 00
March 3, 1873 .....	75,000. 00	March 3, 1905.....	143,506. 00
February 23, 1874.....	20,000. 00	November 1, 1904 (sales)..	46. 00
June 23, 1874.....	75,000. 00		<hr/>
March 3, 1875 .....	100,000. 00	Total .....	5,293,791. 37
August 4, 1877.....	85,000. 00		



CONTRACTS IN FORCE.

*For concrete superstructure on south pier, dated May 24, 1905.*

Name of contractor: The Grattan Contracting Company, Buffalo, N. Y.

Rates:

Removing and repairing old superstructure, per linear foot.....	\$6. 00
New hemlock timber for repairs and sills <i>above</i> 4 feet below mean lake level, per 1,000 feet B. M .....	58. 80
New hemlock timber for repairs <i>below</i> 4 feet below mean lake level, per 1,000 feet B. M .....	120. 00
Norway pine piles 28 feet long and not less than 14 inches in diameter at the large end, per pile.....	18. 00
New stone filling, per cubic yard .....	1. 25
Wrought-iron or steel tie-rods and anchor pins, per pound .....	. 05
Masonry wall, per cubic yard .....	3. 54
Concrete blocks, per cubic yard .....	8. 80
Concrete in place, per cubic yard.....	7. 40
Manhole covers, per cover .....	3. 60

Date of approval: June 10, 1905.

Date of commencement: June 12, 1905.

Date of expiration: June 30, 1906.

*For channel excavation, dated June 6, 1905.*

Name of contractor: Buffalo Dredging Company, Buffalo, N. Y.

Rates: Excavating and removing material, per cubic yard scow measure, 29 cents.

Date of approval: June 22, 1905.

Date of commencement: July 25, 1905.

Date of expiration: December 31, 1905.

COMMERCIAL STATISTICS FOR BUFFALO HARBOR, NEW YORK.

[Compiled from records furnished by collector of customs and from annual report of the Chamber of Commerce of Buffalo, N. Y.]

*Arrivals and departures of vessels for the year ending December 31, 1904.*

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Num- ber.	Tons.	Num- ber.	Tons.	Num- ber.	Tons.	Num- ber.	Tons.
Steam.....	2, 552	4, 368, 894	191	100, 827	2, 560	4, 367, 260	210	95, 502
Sail and barges .....	256	152, 374	665	236, 798	269	158, 415	672	241, 222
Total.....	2, 808	4, 521, 268	856	337, 620	2, 829	4, 525, 675	882	336, 724

Total arrivals and departures:

Number.....	7, 875
Tonnage.....	9, 721, 287
Decrease of tonnage, 1904 under 1903.....	1, 865, 432
Amount of revenue collected, year 1904 (rail commerce).....	\$631, 070. 26

Value of imports:

By lake.....	\$369, 179. 52
By rail.....	4, 153, 878. 00
	4, 523, 057. 52

Value of exports:

By lake .....	797, 250. 00
By rail.....	23, 569, 450. 00
	24, 366, 700. 00

Enrolled tonnage, port of Buffalo, 1904 .....	gross tons..	175, 614
Greatest draft of vessels .....	feet..	19



Receipts by lake for the year 1904.

[Tons of 2,000 pounds.]

Articles.	Quantity.	Articles.	Quantity.
Barley .....	375,980	Oil .....	20
Broom corn.....	339	Oil cake.....	16,739
Canned goods.....	3,365	Paper.....	46
Corn .....	781,144	Peas .....	7,654
Corn meal .....	299	Pelts .....	52
Copper.....	96,254	Pork.....	223
Flour .....	616,097	Rags.....	1,757
Flaxseed .....	284,043	Rubber.....	4,271
Feed .....	140,822	Rye .....	48,625
Fish .....	212	Soap.....	101
Glucose.....	17,550	Starch.....	208
Iron ore .....	2,229,628	Seeds.....	4,093
Iron pigs.....	54,845	Spelter .....	2,153
Lead.....	3,053	Shingles.....	20,213
Lard.....	285	Posts .....	1,012
Lumber.....	351,321	Tallow .....	4,329
Laths.....	3,521	Ties .....	9,640
Malt.....	191	Wheat.....	788,100
Merchandise.....	98,895	Wool .....	6,574
Nails.....	54		
Oats .....	305,984	Total .....	6,280,401
Oatmeal .....	734		

Shipments by lake for the year 1904.

[Tons of 2,000 pounds.]

Coal.....	2,887,517
Cement and plaster.....	481,798
Salt .....	49,881
Sugar.....	398,561
Railroad iron .....	9,648
Unclassified (merchandise).....	<sup>a</sup> 676,174
Total .....	4,503,579

The following statistics of the canal commerce of Buffalo for the year 1904 are compiled from the report of the local collector, Erie Canal:

Canal clearances .....	2,566
Freight coming to Buffalo.....tons..	424,492
Freight leaving Buffalo.....do....	564,233
Steamers and canal boats navigating from Buffalo on the canal (about).....	500
Average freight rate, Buffalo to New York, for wheat per bushel....cents..	3. 2

Assuming that the number of arrivals of canal boats equaled the number of clearances, the grand total of the commerce of Buffalo by lake and canal for the season of 1904 is as follows:

	Arrivals and de- partures.	Receipts of freight.	Shipments of freight.
Lake .....	7,875	6,280,401	4,503,579
Canal.....	5,132	424,492	564,233
Total .....	12,507	6,704,893	5,067,812

Total receipts and shipments.....tons..	11,772,705
Passengers arrived and departed by water in 1904.....	615,000

<sup>a</sup> From monthly summary of commerce and finance of the United States, 1904, Bureau of Statistics, Department of Commerce and Labor.

## Q Q 4.

IMPROVEMENT OF LAKE ERIE ENTRANCE TO BLACK ROCK HARBOR  
AND ERIE BASIN, NEW YORK.

## REPORT OF OPERATIONS.

At the beginning of the fiscal year work was under way, with one dredge and five drill boats, under the contract of the Buffalo Dredging Company.

Drilling continued with from four to five drill boats until November 5, 1904, when two were withdrawn for the season. The remainder were operated until November 17 and withdrawn for the season.

Dredging continued until December 9, 1904, when work closed for the season.

The contractors having failed to earn the amount of money required by their contract, their attention was called to these requirements November 17 and December 13, 1904, and copies of the correspondence forwarded to the Chief of Engineers.

A survey of the excavation completed in 1904 was made through ice January 18 to February 7, 1905, and showed an excavation less than that previously estimated and paid for in monthly payments amounting to 12,659 cubic yards, at 66 cents, \$8,354.94.

Under paragraph 80 of the specifications, "no subsequent payments will be made until the deficiency is made up."

Work for the season of 1905 was resumed March 30 with two drill boats; one was added April 5, another April 19, and the four boats were operated to the close of the fiscal year.

Dredging was begun for the season of 1905 on June 17 with one dredge, and continued to the close of the fiscal year. The total amount dredged during the year was as follows (place measure):

Channel section:	Cubic yards.
Rock .....	32, 222
Earth .....	3, 111
Basin section:	
Earth .....	2, 786

The following is a record of the work of the drill boats during the year:

	Square feet.
Channel section, area drilled and blasted .....	120,000
Basin section, area drilled and blasted .....	347,600

At the close of the fiscal year the channel section is completed, except a strip 75 feet wide and 600 feet long next to the basin section and a few scattered spots where the depth is 19 feet and over.

Dredging of the basin section is fairly started.

## PROPOSED OPERATIONS AND REMARKS.

The work of excavation will be continued under the contract. There will be required to be appropriated for the ensuing fiscal year the balance of the estimate for completion of project, viz, \$237,643.

*Money statement.*

July 1, 1904, balance unexpended .....  
Amount appropriated by sundry civil act approved March 3, 1905 ...  
  
June 30, 1905, amount expended during fiscal year, for works of impr  
ment .....  
  
July 1, 1905, balance unexpended .....  
  
July 1, 1905, amount covered by uncompleted contracts .....  
  
Amount (estimated) required for completion of existing project .  
  
{ Amount that can be profitably expended in fiscal year ending  
1907, for works of improvement, in addition to the balan  
pended July 1, 1905 .....  
Submitted in compliance with requirements of sundry ci  
June 4, 1897.

STATEMENT OF APPROPRIATIONS.

June 13, 1902 .....  
March 3, 1903 .....  
April 28, 1904 .....  
March 3, 1905 .....  
  
Total .....

CONTRACTS IN FORCE.

*Contract for excavation in Lake Erie entrance to Black  
New York, dated February 16,*

Name of contractor: Buffalo Dredging Company.  
Rates:  
Excavation of channel, per cubic yard, place  
Excavation of basin, per cubic yard, place n  
Placing rock with derrick, per ton.....  
Date of approval: March 3, 1903.  
Date of commencement: April 29, 1903.  
Date of expiration: December 31, 1906.

COMMERCIAL STAT

For the commercial statistics relating to this  
of Buffalo Harbor. There are no means of s  
portion of the harbor covered by this improve  
harbor.

Q Q 5.

IMPROVEMENT OF BUFFALO ENTRANCE  
ROCK HARBOR, N.Y.

A full description of the locality and a  
the work is printed, with map, in House l  
Congress, first session, and in Report of  
1897, page 3245 et seq.; and a history of th  
in the Report of the Chief of Engineers for ..

## REPORT OF OPERATIONS.

There were no operations during the past fiscal year, and the entire breakwater is in good condition.

## REMARKS.

The project being completed no further estimate is made.

It is desired to keep the funds now on hand for maintenance and contingencies.

*Money statement.*

July 1, 1904, balance unexpended .....	\$3,264.44
July 1, 1905, balance unexpended .....	3,264.44

## APPROPRIATIONS.

March 3, 1899 .....	\$50,000.00
June 6, 1900 .....	191,701.25
Total .....	241,701.25

## COMMERCIAL STATISTICS.

For the commercial statistics relating to this work reference is made to the statistics of Buffalo Harbor. There are no means of separating the statistics relating to the portion of the harbor covered by this improvement from the general statistics of the harbor

## Q Q 6.

## IMPROVEMENT OF BLACK ROCK HARBOR AND CHANNEL, NEW YORK.

## REPORT OF OPERATIONS.

This is a new work, the first appropriation for which was made by the river and harbor act of March 3, 1905, as follows:

For improvement in accordance with the report contained in House Document numbered four hundred and twenty-eight, Fifty-eighth Congress, second session, one hundred thousand dollars.

*Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute such project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate six hundred thousand dollars in addition to the sum herein appropriated.

*Provided further*, That no portion of the amount herein provided shall be expended until the Secretary of War shall have satisfactory assurance of the construction of the barge canal projected by the State of New York.

*And provided further*, That the Secretary of War shall report as to whether any portion of the expense of the improvement proposed by said House document ought in equity be borne by the abutting owners of the property along which such improvements are to be made, in consideration of any special benefits derived by such property owners through such improvements.

A project for the expenditure of available funds was submitted March 17, 1905, and so much of it approved as related to obtaining grants of lands and structures needed for the work, with directions to submit further project before construction work is begun.

A proposed application to the commissioners of the land office, State of New York, for lands and structures, was forwarded to the War Department for approval March 27, approved by the Secretary of War April 1, and forwarded to the commissioners April 4, 1905.

This application was for the following lands, structures, and rights of way:

(a) The structure known as the Bird Island pier, with the strip of land owned by the State, in continuance of the pier, along the east shore of Squaw Island to the north end of said land, near the present ship lock.

(b) The wall or partition between Black Rock Harbor and the Erie Canal from station 49+50 on the accompanying map to the foot of Amherst street, including the uplands adjacent to the present ship lock.

(c) All the land under water of Black Rock Harbor, from the foot of Maryland street to and including the present ship lock, including also the land owned by the State near the ship lock and within the limits of the proposed improvement.

(d) The grant to the United States of the right to use the present Erie Canal, with a grant of the land under its waters, from the New York Central Railroad bridge, at the foot of Vermont street extended, north to the Amherst street crossing, and a grant of the land used as a towpath for the same distance.

(e) The right of way for the proposed channel, from the State of New York or the city of Buffalo, across and through the city trunk sewer at the foot of Albany street and over the city intake at the waterworks, near station 70 on the inclosed map.

(f) The right of way for the proposed channel, from the State of New York or the city of Buffalo, through the site of the present bridges over the Erie Canal and Black Rock Harbor at the foot of Ferry street.

Under date of April 12, 1905, a letter was received from the deputy secretary of state of New York, saying that the application had been referred to the attorney-general; and on May 29, 1905, a further letter was received, saying that action on the application had been postponed and the matter referred to the president of the board to appoint a committee to confer with the United States Government. No further communications had been received at the close of the fiscal year.

The Chief of Engineers in indorsement of April 13, 1905, directs the officer in charge "to make the necessary investigation and supply data for the report required of the Secretary of War in the final proviso of the appropriation item, giving his own views and the conclusions which he shall reach as the result of his investigation."

This investigation is in progress at the close of the fiscal year.

#### PROPOSED OPERATIONS AND REMARKS.

It is proposed, during the next fiscal year, to finish the investigation and collection of data referred to above; to continue negotiations for the grant of lands and structures needed, and when this is brought to a favorable conclusion to advertise for proposals, make the necessary contracts, and commence work on the excavation of a channel 200 feet wide and 23 feet deep from the foot of Maryland street to station 49+50, being the upper 4,950 feet of the proposed channel.

No further estimate of funds is made, pending a settlement of the questions connected with this work.

Money statement.

Amount appropriated by river and harbor act approved March 3, 1905.	\$100,000.00
July 1, 1905, balance unexpended .....	100,000.00
	<hr/>
Amount (estimated) required for completion of existing project .....	4,400,000.00

APPROPRIATION.

March 3, 1905 .....	\$100,000
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COMMERCIAL STATISTICS.

For commercial statistics, see report on Buffalo Harbor and on Tonawanda Harbor and Niagara River, New York.

Q Q 7.

IMPROVEMENT OF TONAWANDA HARBOR AND NIAGARA RIVER,  
NEW YORK.

REPORT OF OPERATIONS.

Dredging of channels with plant hired from the Lake Erie Dredging Company, under contract of September 6, 1902, was in progress at the beginning of the fiscal year.

Work on the "island channel below the island bridge," extending from the bridge to the foot of Tonawanda Island, was continued until July 19, 1904, when it was completed, 18 feet deep at mean river level, 22,847 cubic yards, scow measure, having been removed during the fiscal year, at a cost of \$6,755 for hire of plant, or 29.7 cents per cubic yard.

Work on widening and straightening the channel around the foot of Tonawanda Island was continued with one dredge to July 22, two dredges from July 22 to August 16, and one dredge from August 16 to September 22, 1904, when the channel was completed 18 feet deep at mean river level, 39,570 cubic yards, scow measure, having been removed, at a cost of \$14,003.50 for hire of plant, or 35 cents per cubic yard.

Channel along the dock front from the Tonawanda ferry landing to a point opposite the Tonawanda waterworks was dredged to 18 feet at mean river level, from July 15 to August 6, 1904, with one dredge, 11,226 cubic yards, scow measure, being removed, at a cost of \$2,884 for hire of plant, or 25.7 cents per cubic yard.

The work above described completed the dredging in channels in the vicinity of Tonawanda.

Work in the head of the Strawberry Island Reef channel was begun July 20, 1904, and another dredge was added August 5, 1904, the work being completed October 25, 1904; 77,538 cubic yards, scow measure,

were removed, at a cost of \$21,843.50 for hire of plant, or 28½ cents per cubic yard.

The total amount removed from Tonawanda Harbor and Niagara River from September 12, 1902, to October 25, 1904, under contract with the Lake Erie Dredging Company, was 576,070 cubic yards, scow measure, at a cost for hire of plant of \$214,200, or 37 cents per cubic yard.

A small shoal was removed from the Niagara River, 100 feet out from the ore dock of the Tonawanda Iron and Steel Company, at North Tonawanda, June 5, 1905, at a cost of \$80.

The total amount expended during the fiscal year was \$80,059.72.

Money statement.

July 1, 1904, balance unexpended.....	\$110,323.05
June 30, 1905, amount expended during fiscal year, for works of improvement.....	80,059.72
July 1, 1905, balance unexpended .....	30,263.33
Amount (estimated) required for completion of existing project.....	497,287.93

APPROPRIATIONS.

August 11, 1888.....	\$100,000	March 3, 1899.....	\$75,000
September 19, 1890 .....	75,000	June 13, 1902.....	257,700
July 13, 1892.....	75,000		
August 18, 1894.....	50,000	Total .....	682,700
June 3, 1896 .....	50,000		

COMMERCIAL STATISTICS FOR TONAWANDA HARBOR AND NIAGARA RIVER, NEW YORK.

[Furnished by the collectors of customs, Buffalo Creek and Niagara districts.]

Arrivals and departures of vessels for the year ending December 31, 1904.

District and vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Num-ber.	Tons.	Num-ber.	Tons	Num-ber.	Tons.	Num-ber.	Tons.
Buffalo Creek:								
Steam.....	58	34,574	1	7	58	36,179	3	1,033
Sail and barges.....	33	21,471	6	2,934	41	23,266	5	1,977
Niagara:								
Steam.....	296	197,712	35	16,931	302	201,009	24	9,508
Sail and barges .....	262	143,623	47	20,673	281	157,157	30	12,608
Total.....	654	397,380	89	40,545	682	417,611	62	25,126

Total arrivals and departures:	
Number.....	1,487
Tonnage .....	880,662
Decrease of tonnage, 1904 under 1903.....	222,545 tons..
Amount of revenue collected, year 1904, on lake commerce.....	\$107,057.96
Value of imports by lake, year 1904.....	\$789,665.48
Enrolled gross tonnage, Niagara district, 1904.....	21,611
Greatest draft of vessels.....	15 feet..



*Receipts by lake and river for the year 1904.*

[Tons of 2,000 pounds.]

Lumber .....	736,440
Shingles .....	390
Lath .....	888
Railroad ties.....	11,596
Posts.....	1,968
Iron ore .....	145,031
Pig iron .....	10,370
Emery ore.....	137
<b>Total.....</b>	<b>906,820</b>

Shipments by Erie Canal <sup>a</sup> .....	tons..	293,538
Lumber shipments by Erie Canal (included in above) <sup>a</sup> .....	feet B. M..	13,011,651

*Number of vessels passing the International Bridge, Niagara River, 1904.*[Furnished by R. J. McMurray, captain of the tug *International*.]

Steamers .....	5,049
Other vessels .....	1,123
	<hr/>
Total.....	6,172
Season of navigation, May 1 to December 19, 1904.....days..	233
Number of times the bridge draw was opened during season .....	2,962
Average number of times bridge draw was opened per day.....	12.71

<sup>a</sup> Furnished by Erie Canal collector, Tonawanda.



## APPENDIX R R.

### IMPROVEMENT OF HARBORS ON LAKE ONTARIO AND OF ST. LAWRENCE RIVER AND HARBORS THEREON, NEW YORK.

#### REPORT OF COL. H. M. ADAMS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905, WITH OTHER DOCUMENTS RELATING TO THE WORKS.

##### IMPROVEMENTS.

- |  |   |
|--|---|
| 1. Wilson and Oak Orchard harbors, New York. | 6. Harbor at Oswego, New York.  |
| 2. Olcott Harbor, New York.                  | 7. Harbor at Cape Vincent, New York.  |
| 3. Harbor at Charlotte, New York.            | 8. Shoals in the St. Lawrence River between Ogdensburg, New York, and the foot of Lake Ontario. |
| 4. Harbor at Great Sodus Bay, New York.      | 9. Harbor at Ogdensburg, New York.  |
| 5. Harbor at Little Sodus Bay, New York.     |   |

(For letter of transmittal see Appendix Q Q.)

## R R I.

### IMPROVEMENT OF HARBORS AT WILSON AND OAK ORCHARD, NEW YORK.

#### (A) WILSON HARBOR.

##### REPORT OF OPERATIONS.

No work was done during the fiscal year.

The river and harbor act of March 3, 1905, contains a provision repealing all previous provisions for work at this harbor and directing that unexpended funds be turned into the United States Treasury.

In compliance with this act, the unexpended balance on hand (\$493.57) was deposited to the credit of the United States Treasurer March 21, 1905.

##### APPROPRIATIONS.

March 3, 1875 .....	\$10,000.00	June 3, 1896 .....	\$5,000.00
August 14, 1876 .....	10,000.00	May 12, 1897 .....	.50
June 14, 1880 .....	10,000.00	March 3, 1899 .....	2,500.00
March 3, 1881 .....	10,000.00	June 13, 1902 (allotment July 16, 1902) .....	2,250.00
August 2, 1882 .....	10,000.00		
August 5, 1886 .....	10,000.00		
August 11, 1888 .....	5,000.00	Total .....	74,750.50

2390 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

COMMERCIAL STATISTICS FOR WILSON, N. Y.

Arrivals and departures of vessels for the year ending December 31, 1904.

Vessels.	Arrivals from for- eign ports.		Departures to for- eign ports.	
	Number.	Tons.	Number.	Tons.
Steam.....	1	373	.....	.....
Sail and barges .....	2	88	2	88
Total .....	3	461	2	88

Total arrivals and departures (tonnage, 549) .....	5
Greatest draft of vessels .....	9
Amount of revenue collected, year ending December 31, 1904.....	\$141. 65
Value of foreign imports, year ending December 31, 1904 .....	\$1, 116. 00
Value of foreign exports, year ending December 31, 1904 .....	None.

Receipts by lake.

[Net tons.]

Articles.	1899.	1900.	1901.	1902.	1903.	1904.
Lumber, logs, and posts .....	81	612	265	181	479	173
Laths .....	12	17	39	17	10	.....
Shingles .....	31	24	8	.....	.....	.....
Total.....	124	653	312	148	489	173

No shipments by water.

(B) OAK ORCHARD HARBOR.

REPORT OF OPERATIONS.

Repairs to piers were begun October 11, 1904, and finished November 2, 1904. They consisted of removing decayed and broken wall timbers and deck plank from both piers and replacing them with new hemlock; 13,000 feet B. M. was used, and the total cost for material and labor was \$676.07.

A gale November 13, 1904, nearly breached the west pier at the inner end. Urgent repairs were made November 21-28 at a cost of \$97.69.

No dredging was done during the year.

The river and harbor act of March 3, 1905, contains a provision repealing all previous provisions for work at this harbor, and directing that all unexpended funds be turned into the United States Treasury.

In compliance with this act, the unexpended balance on hand (\$634.21) was deposited to the credit of the United States Treasurer March 21, 1905.

Money statement.

July 1, 1904, balance unexpended .....	\$1, 901. 54
June 30, 1905, amount expended during fiscal year:	
For maintenance of improvement .....	\$773. 76
Turned into Treasury.....	1, 127. 78
	<hr/> 1, 901. 54

APPROPRIATIONS.			
July 4, 1836.....	\$5, 000	June 18, 1878.....	\$2, 000
March 3, 1837.....	5, 000	March 3, 1879.....	1, 000
July 7, 1838.....	5, 000	June 14, 1880.....	500
June 11, 1844.....	5, 000	August 2, 1882.....	3, 000
August 30, 1852.....	10, 500	July 5, 1884.....	5, 000
March 2, 1867.....	87, 000	August 5, 1886.....	12, 500
July 11, 1870.....	8, 000	August 11, 1888.....	6, 000
March 3, 1871.....	10, 000	September 19, 1890.....	5, 000
June 19, 1872.....	2, 500	June 13, 1902 (allotment July 16,	
March 3, 1873.....	10, 000	1902).....	2, 250
June 23, 1874.....	10, 000		
March 3, 1875.....	10, 000	Total .....	207, 250
August 14, 1876.....	2, 000		

COMMERCIAL STATISTICS FOR OAK ORCHARD HARBOR, N. Y.

*Arrivals and departures of vessels for the year ending December 31, 1904.*

Vessels.	Arrivals from foreign ports.		Departures to home ports.	
	Number.	Tons.	Number.	Tons.
Steam.....				
Sail and barges.....	5	351	1	147
Total.....	5	351	1	147

Total arrivals and departures (tonnage, 498).....	6
Amount of revenue collected year ending December 31, 1904.....	\$372. 00
Value of imports year ending December 31, 1904.....	\$3, 940. 08
Greatest draft of vessels.....feet..	10

*Receipts by lake.*

[Net tons.]

	1901.	1902.	1903.	1904.
Posts.....	200	322	250	242
Laths.....	24	.....	28	14
Shingles.....	116	96	167	149
Total.....	340	418	445	405

Shipments by lake, none.

R R 2.

IMPROVEMENT OF OLCOTT HARBOR, NEW YORK.

REPORT OF OPERATIONS.

No work was done during the fiscal year, no funds being available.

PROPOSED OPERATIONS AND REMARKS.

The piers are badly decayed and the channel is not stable.  
The commerce of Olcott Harbor is very small and is not increasing.  
No further estimate is submitted for work at this harbor.

Money statement.

July 1, 1904, balance unexpended .....	\$174. 29
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	3. 70
July 1, 1905, balance unexpended .....	170. 59

APPROPRIATIONS.

March 2, 1867 .....	\$60, 000	March 3, 1881 .....	\$3, 000
July 11, 1870 .....	10, 000	August 5, 1886 .....	10, 000
March 3, 1871 .....	5, 000	August 11, 1888 .....	5, 000
June 10, 1872 .....	10, 000	September 9, 1890 .....	30, 000
March 3, 1873 .....	10, 000	June 13, 1902 .....	15, 000
June 23, 1874 .....	10, 000		
March 3, 1875 .....	10, 000	Total .....	178, 000

COMMERCIAL STATISTICS FOR OLCOTT, N. Y.

Arrivals and departures of vessels for the year ending December 31, 1904.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	Tons.
Steam. ....	7	1, 618	26	9, 951	7	1, 618	30	11, 848
Sail and barges .....								
Total .....	7	1, 618	26	9, 951	7	1, 618	30	11, 848

Total arrivals and departures (tonnage, 25,035) .....	70
Amount of revenue collected year ending December 31, 1904 .....	None.
Value of imports year ending December 31, 1904 .....	None.
Value of exports year ending December 31, 1904 .....	None.
Greatest draft of vessels .....	feet.. 9

Receipts by lake.

[Net tons.]

Articles.	1901.	1902.	1903.	1904.
Lumber, logs, etc .....	375	477	1, 760	None.

Shipments by lake, none; about 5,000 passengers arrive and depart by water annually.

R R 3.

IMPROVEMENT OF HARBOR AT CHARLOTTE, NEW YORK.

REPORT OF OPERATIONS.

Concrete superstructure on west pier.—Work of reconstructing a portion of the west pier and replacing the timber superstructure with concrete was begun July 6, 1904, and continued to November 30, 1904, when it was discontinued for the season, 316 linear feet having been practically completed.

The work was in two sections, one of 173 feet from station 20+16 to station 21+89, and one of 143 feet from station 23+8 to station 24+51.

The pier was removed to a depth of 8½ feet below the zero of the Oswego gauge, the work being done with the U. S. dredge *Frontenac*. Four new cribs were built and sunk in place and filled with stone recovered from the old pier and with new stone purchased. On these cribs the new superstructure of concrete was placed, as follows:

	Cubic yards.
66 face wall blocks .....	260.37
26 cross-wall blocks .....	68.85
Total blocks .....	329.22
11 sections of deck, mass concrete .....	452.087
Total .....	781.307

The total cost of the concrete was \$6,136.89, or \$7.85 per cubic yard, and of the whole work of reconstruction, \$18,529.65, or \$52.28 per linear foot.

During February and March, 1905, the derrick scow was repaired and strengthened at a cost of \$813.73.

An appropriation of \$80,000 was made by the river and harbor act of March 3, 1905, and project for the expenditure of these funds was submitted and approved.

This project includes the reconstruction of 865 feet of the west pier and 363 feet of the east pier by day labor and purchase of materials. Two material scows were built and timber, iron, and concrete materials were purchased.

The framing of timber for cribs was begun April 17, and the removal of the west pier with the U. S. dredge *Frontenac* started May 9, 1905. The substructure was in such poor condition that it was necessary to remove it to a depth of 10½ feet below the zero of the Oswego gauge.

At the close of the fiscal year the work was well under way.

*Repairs to piers.*—In October, 1904, a breach of 33 feet was made in the east pier at station 24+44; temporary repairs were made by building bulkheads at each end of the breach, using 2,500 feet of Georgia pine. Cost for labor and materials, \$100.

*Dredging.*—Dredging operations were begun in the channel between the piers July 25, 1904, with the U. S. dredge *Frontenac*, and were carried on at intervals for the remainder of the season, the dredge being also used to tear out the west pier for the work of reconstruction; 15,095 cubic yards of sand and mud were removed from the channel, at a cost of \$1,959.75, or 13 cents per cubic yard, scow measure.

#### PROPOSED OPERATIONS AND REMARKS.

Charlotte is the lake port of Rochester and has a large commerce in coal brought by rail from Pennsylvania mines and shipped down the St. Lawrence River and to Canadian ports on Lake Ontario.

Its commerce is large and growing, and the maintenance of its harbor to the full extent of the project is advisable.

The channel maintained between the piers and to deep water in the lake is 3,800 feet long, and requires redredging annually on account of filling, caused by deposit during high water in the Genesee River



of material in suspension, and also because of sand drifting into the channel from the lake.

The crib substructure underlying about 2,900 feet of the piers was built in 1829-1834, and is of such poor construction that the crib-wall timbers are gradually being washed out to the depth of about 10 feet below water, placing the piers in a dangerous condition.

The timber superstructure of the piers is also becoming exceedingly rotten.

It is estimated that 1,300 feet of the piers should be torn out to below the wrecked cribwork, new cribwork put in, and then covered with a concrete superstructure, without unnecessary delay. The piers are well settled down, but require extensive repairs to the crib substructure, and should, when repaired, receive concrete superstructure instead of being rebuilt with wood. This will cost, it is estimated, \$55 per linear foot, or \$71,500.

For ordinary maintenance and dredging there will be required \$8,500, making the total amount required for the next fiscal year, \$80,000.

*Money statement.*

July 1, 1904, balance unexpended .....	\$24,932. 39
Amount appropriated by river and harbor act approved March 3, 1905. ....	80,000. 00
	<hr/>
	104,932. 39
June 30, 1905, amount expended during fiscal year:	
For maintenance of improvement .....	\$28,188. 72
Turned into Treasury .....	1,269. 07
	<hr/>
	29,457. 79
July 1, 1905, balance unexpended .....	75,474. 60
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	80,000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

May 23, 1828 .....	\$300. 00	March 3, 1875 .....	\$5,000. 00
March 2, 1829 .....	10,000. 00	June 18, 1878 .....	1,000. 00
March 3, 1829 .....	13,335. 00	March 3, 1879 .....	1,000. 00
March 2, 1831 .....	16,670. 00	June 14, 1880 .....	5,000. 00
February 24, 1832 .....	16,000. 00	March 3, 1881 .....	2,500. 00
March 2, 1833 .....	15,000. 00	August 2, 1882 .....	35,000. 00
June 28, 1834 .....	20,000. 00	July 5, 1884 .....	20,000. 00
March 3, 1835 .....	2,390. 00	August 5, 1886 .....	26,250. 00
July 2, 1836 .....	20,000. 00	August 10, 1888 .....	45,000. 00
March 3, 1837 .....	10,000. 00	September 19, 1890 .....	25,000. 00
July 7, 1838 .....	25,000. 00	July 13, 1892 .....	25,000. 00
June 11, 1844 .....	10,000. 00	August 18, 1894 .....	15,000. 00
August 20, 1852 .....	20,000. 00	June 3, 1896 .....	12,000. 00
March 3, 1853 .....	176. 10	March 3, 1899 .....	7,000. 00
June 28, 1864 .....	25,000. 00	June 6, 1900 .....	<sup>a</sup> 3,500. 00
June 23, 1866 .....	75,607. 30	June 13, 1902 .....	30,000. 00
July 25, 1868 .....	1,100. 00	April 28, 1904 .....	23,000. 00
April 10, 1869 (allotment) ...	1,000. 00	March 3, 1905 .....	80,000. 00
July 11, 1870 .....	12,000. 00		<hr/>
March 3, 1871 .....	10,000. 00	Total .....	664,828. 40

<sup>a</sup> Unexpended balance of \$41.24 returned into Treasury.

## COMMERCIAL STATISTICS FOR CHARLOTTE HARBOR, NEW YORK.

*Arrivals and departures of vessels for the year ending December 31, 1904.*

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.
Steam .....	259	163,656	617	462,364	222	116,864	640	509,156
Sail and barges .....	41	55,082	208	86,480	34	42,837	222	90,596
Total .....	300	218,738	825	548,844	256	159,201	862	599,752

Total arrivals and departures (tonnage 1,526,535) .....	2,243
Increase of tonnage, 1904 over 1903 .....	43,128
Amount of revenue collected, year ending December 31, 1904 .....	\$4,051.61
Value of imports, year ending December 31, 1904 .....	\$61,421.50
Value of exports, year ending December 31, 1904 .....	\$1,400,561.00
Greatest draft of vessels .....	16 feet..
Enrolled tonnage, port of Charlotte .....	731 gross tons..

*Receipts by lake.*

[Net tons.]

	1900.	1901.	1902.	1903.	1904.
Poles and railroad ties .....	1,115	6,352	3,451	406	449
Lumber .....	585	61	546	707	167
Posts, logs, and pulp wood .....	513	2,974	4,868	5,215	4,318
Lath .....		255	209	181	46
Shingles .....	14	99	238	75	21
Merchandise .....	250	483	27	1,774	52
Feldspar .....					4,907
Total .....	2,477	10,224	9,339	8,358	9,960

*Shipments by lake.*

[Net tons.]

	1900.	1901.	1902.	1903.	1904.
Coal .....	397,032	538,843	547,850	560,081	543,851
Oils and merchandise .....	96	140	501	730	401
Total .....	397,128	538,983	548,351	560,811	544,252

## R R 4.

## IMPROVEMENT OF HARBOR AT GREAT SODUS BAY, NEW YORK.

## REPORT OF OPERATIONS.

The dredging of the channel between the piers, which was in progress at the beginning of the fiscal year, was carried on with the U. S. dredge *Frontenac* until July 20, 1904, when the work was completed.

The total amount dredged during the season was 14,260 cubic yards of sand, etc., at a cost of \$1,921.28, or 13½ cents per cubic yard, scow measure; leaving the channel between the piers 150 feet wide and 15 feet deep at low water, and outside the piers 150 feet flaring to 190 feet to the 15-foot contour in Lake Ontario.

Repairs to piers, which were suspended at the beginning of the fiscal year to await material, were resumed September 13, 1904, and completed October 10, 1904. None but the most urgent repair work could be done, owing to scarcity of funds. In making these repairs 15,000 feet B. M. of hemlock timber was used, and the total cost for material and labor was \$516.93.

PROPOSED OPERATIONS AND REMARKS.

No appropriation was made for this work in the river and harbor act of March 3, 1905.

The channel to be maintained is 1,800 feet long and 150 feet wide from the bay to the 15-foot curve in Lake Ontario and requires more or less dredging annually on account of shoaling, caused by sand drifting in from the lake. There are 2,150 feet of breakwater and 2,874 feet of piers to be maintained. These are old timber crib structures in an advanced stage of decay, and require constant and extensive repairs to maintain them. They should all be rebuilt with concrete superstructure in the near future.

It is estimated that \$10,000 will be required for maintenance of channel and repairs to piers for the ensuing fiscal year, and the appropriation of this amount is recommended.

The commerce of Great Sodus Bay is not large, consisting mostly of the shipment of coal, brought from Pennsylvania mines by rail.

Money statement.

July 1, 1904, balance unexpended .....	\$2,575.14
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	2,005.69
July 1, 1905, balance unexpended .....	569.45
<hr/>	
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	10,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

March 2, 1829 .....	\$12,500.00	June 18, 1878 .....	\$5,000.00
March 3, 1829 .....	15,280.00	March 3, 1879 .....	2,000.00
March 2, 1831 .....	17,450.00	June 14, 1880 .....	3,000.00
February 24, 1832 .....	17,000.00	March 3, 1881 .....	5,000.00
March 2, 1833 .....	15,000.00	August 2, 1882 .....	25,000.00
June 28, 1834 .....	15,000.00	July 5, 1884 .....	10,000.00
March 3, 1835 .....	11,790.00	August 5, 1886 .....	16,875.00
July 2, 1836 .....	12,600.00	August 10, 1888 .....	24,000.00
March 3, 1837 .....	12,000.00	September 19, 1890 .....	10,000.00
July 7, 1838 .....	10,000.00	July 13, 1892 .....	15,000.00
June 11, 1844 .....	5,000.00	August 18, 1894 .....	15,000.00
August 20, 1852 .....	10,000.00	June 3, 1896 .....	8,000.00
June 23, 1866 .....	53,151.80	March 3, 1899 .....	14,000.00
March 2, 1867 .....	80,000.00	July, 1899 (repayment) .....	1.00
July 11, 1870 .....	5,000.00	June 13, 1902 .....	5,000.00
June 10, 1872 .....	15,000.00	June 13, 1902 (allotment) ...	1,250.00
June 23, 1875 .....	15,000.00		
March 3, 1875 .....	10,000.00		
August 14, 1876 .....	5,000.00	Total .....	495,897.80

COMMERCIAL STATISTICS FOR GREAT SODUS BAY, NEW YORK.

Arrivals and departures of vessels for the year ending December 31, 1904.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	Tons.
Steam.....	11	2,052	35	4,610	9	1,558	37	5,088
Sail and barges.....	8	2,204	71	11,949	8	1,759	72	12,421
Total.....	19	4,256	106	16,559	17	3,317	109	17,509

Total arrivals and departures (tonnage, 41,641) .....	251
Increase of tonnage 1904 over 1903.....	tons.. 11,087
Amount of revenue collected year ending December 31, 1904.....	\$44.96
Value of imports year ending December 31, 1904.....	\$7,281.00
Value of exports year ending December 31, 1904.....	\$97,435.00
Greatest draft of vessels.....	feet.. 13½
Enrolled tonnage.....	None.

Receipts and shipments by lake.

[Net tons.]

	Receipts.			Shipments.		
	1902.	1903.	1904.	1902.	1903.	1904.
Coal .....				21,251	13,597	28,569
Poles and railroad ties.....	375					
Posts, lumber, etc.....						
Merchandise.....	3	3	8		13	7
Feldspar .....	5,097	5,262	2,213			
Total.....	5,475	5,265	2,221	21,251	13,610	28,576

Several thousand passengers arrive and depart by water annually.

R R 5.

IMPROVEMENT OF HARBOR AT LITTLE SODUS BAY, NEW YORK.

REPORT OF OPERATIONS.

Repairs were made to both piers and the east breakwater September 14 to October 18, 1904, by replacing broken and rotten deck plank; 17,740 feet B. M. of hemlock was used. Cost for labor and material, \$419.89.

A survey of the channel was made April 6 to 9, 1905, and it was found that a shoal had formed on the east side of the channel at the end of the piers; this was removed by the U. S. dredge *Frontenac* April 25 to May 8, 1905, 4,210 cubic yards of sand being removed at a cost of \$827.73, or 19.7 cents per cubic yard, scow measure.

An appropriation of \$30,000 was made by the river and harbor act of March 3, 1905, and project for the expenditure of these funds was submitted and approved. This project includes the removal of 600 feet of the old timber superstructure of the east pier and replacing it with concrete, by day labor and purchase of materials. A concrete mixer, hoisting engine, etc., have been purchased, concrete materials

contracted for, and a derrick scow is being built. The work was fairly started at the close of the fiscal year.

Work under contract with the Buffalo Dredging Company for extending the east pier was in progress at the beginning of the fiscal year and continued to October 13, 1904, when work was suspended owing to continued high seas. Work has not been resumed since, but will be early in the next fiscal year, when the work will be finished. Under the terms of the contract it was to have been completed December 1, 1903, and the time limit was waived for sixty additional working days.

#### PROPOSED OPERATIONS AND REMARKS.

The entrance channel is 2,300 feet in length from the bay to the 15-foot curve in the lake. It requires more or less dredging annually on account of shoaling, caused chiefly by the drifting of sand from the west.

Besides the maintenance of this channel there are 4,937 feet of piers and breakwaters to be maintained, viz, the west pier, 1,747 feet; the east pier, 1,510 feet, and the east breakwater, 1,680 feet. The west breakwater is entirely covered by accretions of sand. The piers are much in need of repairs, portions of them being very rotten.

The piers must soon be thoroughly repaired or they will collapse and be carried away by the seas. When these repairs are made it will be advisable to use concrete in place of wood for the superstructures. It is estimated that 1,400 feet of the piers, in addition to that now being repaired, should have their superstructures renewed with concrete in the near future. This will cost \$50 per foot, or \$70,000.

It is estimated that there will be required for the ensuing fiscal year:

For ordinary repairs and dredging.....	\$5, 000
For replacing 1,400 feet of wooden superstructure with concrete .....	70, 000
Total .....	75, 000

The commerce of this port consists chiefly of shipments of coal brought by rail from Pennsylvania mines and destined to Canadian ports on Lake Ontario and the St. Lawrence River.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$22, 383. 57
Amount appropriated by river and harbor act approved March 3, 1905..	30, 000. 00
	<hr/> 52, 383. 57
June 30, 1905, amount expended during fiscal year:	
For maintenance of improvement.....	\$3, 822. 10
Turned into Treasury .....	1, 179. 04
	<hr/> 5, 001. 14
July 1, 1905, balance unexpended .....	47, 382. 43
July 1, 1905, amount covered by uncompleted contracts.....	20, 016. 00
	<hr/> <hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905.....	75, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

August 30, 1852.....	\$10,000.00	March 3, 1881 .....	\$20,000.00
April 9, 1864 .....	1,778.36	August 2, 1882.....	25,000.00
April 9, 1864 .....	2,224.00	July 5, 1884 .....	10,000.00
April 9, 1864 .....	99.00	August 5, 1886.....	12,500.00
June 23, 1866.....	33,840.41	August 10, 1888.....	16,000.00
March 2, 1867 .....	50,000.00	September 19, 1890 .....	13,000.00
April 10, 1869 .....	1,500.00	July 13, 1892 .....	6,000.00
July 11, 1870 .....	5,000.00	August 18, 1894.....	8,000.00
March 3, 1871 .....	15,000.00	June 3, 1896.....	8,000.00
June 10, 1872.....	15,000.00	March 3, 1899 .....	5,500.00
March 3, 1873 .....	15,000.00	July, 1899 (repayment).....	1.00
June 23, 1874.....	15,000.00	June 13, 1902.....	25,000.00
March 3, 1875 .....	10,000.00	June 13, 1902 (allotment) ...	2,000.00
August 14, 1876.....	5,000.00	March 3, 1905 .....	30,000.00
June 18, 1878.....	10,000.00		
March 3, 1879 .....	5,000.00	Total .....	395,442.77
June 14, 1880.....	20,000.00		

CONTRACT IN FORCE.

Contract for extending the east pier at Little Sodus Bay, New York, dated March 28, 1903.

Name of contractor: Buffalo Dredging Company.

Rates:

Excavation for foundation, for all .....	\$1,000.00
Foundation stone, per cubic yard.....	1.60
Timber cribs, per linear foot .....	36.00
Stone in superstructure, per cubic yard .....	1.50
Hemlock timber, per M feet B. M .....	30.00
Concrete blocks, per cubic yard .....	11.50
Concrete in place, per cubic yard.....	9.00
Manhole covers, each.....	5.00
Corner posts, for two .....	80.00
Mooring posts, each .....	10.00
White-oak fender, per linear foot.....	.70

Date of approval: April 7, 1903.  
Date of commencement: May 10, 1903.  
Date of completion: December 1, 1903.  
Time limit waived.

COMMERCIAL STATISTICS FOR LITTLE SODUS BAY, NEW YORK.

Arrivals and departures of vessels for the year ending December 31, 1904.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.
Steam.....	58	4,814	71	11,350	36	2,040	89	13,512
Sail and barges .....	38	11,720	154	43,186	12	2,796	187	54,270
Total.....	96	16,534	225	54,536	48	4,836	276	67,782

Total arrivals and departures (tonnage, 148,688).....	646
Increase of tonnage, 1904 over 1903 .....	20,211 tons..
Amount of revenue collected, year ending December 31, 1904.....	\$941.64
Value of imports, year ending December 31, 1904.....	\$4,747.00
Value of exports, year ending December 31, 1904.....	\$556,064.00
Greatest draft of vessels .....	14 feet..
Enrolled tonnage.....	None.

Receipts and shipments by lake.

[Net tons.]

Articles.	Receipts.			Shipments.		
	1902.	1903.	1904.	1902.	1903.	1904.
Coal.....				48,897	118,735	135,481
Poles and railroad ties.....	3,584	306	812			
Posts and wood.....	02	1,250	950			
Fish and miscellaneous.....					15	15
Lumber and shingles.....		386				
Total.....	3,646	1,942	1,762	48,897	118,750	135,496

Several thousand passengers arrive and depart by water annually.

R R 6.

IMPROVEMENT OF HARBOR AT OSWEGO, NEW YORK.

At the beginning of the fiscal year work was in progress on repairs to the substructure of the outer breakwater.

The method employed was to remove the deck and take out the stone filling from the cribs to a depth of about 14 feet below the water, put in corner posts, draw the lake face in place, and put back the filling and deck. Repairs were made in this manner during the season of 1904 at stations 21+45, 23, and 29+25.

May 20, 1905, repairs were commenced at station 12+20 and were continued to the end of the fiscal year. The superstructure was repaired during the fiscal year by replacing broken and decayed deck planks and wall timbers, at a cost for materials and labor of \$1,881.06.

Broken and decayed deck planks were replaced on the inner breakwater.

New bolts were put in the sheet piling at the light-house extension pier by divers, at a cost of \$230.

During November, 1904, the U. S. dredge *Frontenac* removed five shoals which had formed alongside the harbor face of the outer breakwater between stations 36 and 44+50, and one inside the old breakwater. After finishing this work the dredge was laid up for the winter.

Work was begun September 1, 1904, under contract with the Daly & Hannan Dredging Company, on rock excavation on the west side of Oswego River at the foot of Seneca street. The area deepened is a triangular piece of about 12,000 square feet, extending from the north side of Seneca street to the area before deepened. The work was completed December 31, 1904, the area having been deepened to 15 feet below the zero of the Oswego gauge; 2,500 cubic yards of rock were removed at a cost of \$3.90 per cubic yard; total, \$9,750.

The Government plant and property were cared for and kept in repair.

Slight repairs were made to the storehouse in September, 1904.



## PROPOSED OPERATIONS AND REMARKS.

It is proposed to continue the repair of the outer breakwater under plan "B" as printed on page 3368, Report of the Chief of Engineers for 1904. No funds will be needed for this during the fiscal year 1907, as sufficient funds will be on hand.

It is estimated that \$100,000 will be needed for repairing the superstructure, and \$25,000 for dredging, repairing inner breakwater, and contingencies, making \$125,000 to be appropriated.

*Money statement.*

July 1, 1904, balance unexpended .....	\$28,392.32
Amount appropriated by river and harbor act approved March 3, 1905..	100,000.00
	<hr/>
	128,392.32
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	17,906.15
	<hr/>
July 1, 1905, balance unexpended .....	110,486.17
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	125,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

## APPROPRIATIONS.

March 20, 1826 .....	\$200.00	March 3, 1871 .....	\$100,000.00
March 2, 1827 .....	33,348.64	June 10, 1872 .....	100,000.00
May 19, 1828 .....	9,583.39	March 3, 1873 .....	100,000.00
March 3, 1829 .....	7,472.00	June 3, 1874 .....	75,000.00
March 2, 1831 .....	2,812.92	March 3, 1875 .....	90,000.00
March 2, 1831 .....	18,600.00	August 14, 1876 .....	90,000.00
March 2, 1831 .....	519.00	June 18, 1878 .....	90,000.00
March 2, 1831 .....	84.92	March 3, 1879 .....	90,000.00
February 24, 1832 .....	19,000.00	June 14, 1880 .....	90,000.00
March 2, 1833 .....	8,400.00	March 3, 1881 .....	50,000.00
June 28, 1834 .....	30,000.00	August 2, 1882 .....	80,000.00
July 2, 1836 .....	20,000.00	July 5, 1884 .....	80,000.00
March 3, 1837 .....	15,000.00	August 6, 1886 .....	71,250.00
July 7, 1838 .....	46,067.00	August 10, 1888 .....	100,000.00
June 11, 1844 .....	20,000.00	September 19, 1890 .....	30,000.00
August 20, 1852 .....	40,000.00	July 13, 1892 .....	40,000.00
August, 1860 (allotment transferred from light-house) .....	30,000.00	August 18, 1894 .....	37,000.00
June 28, 1864 (allotment) .....	25,000.00	June 3, 1896 .....	60,000.00
June 23, 1866 .....	45,000.00	March 3, 1899 .....	60,000.00
March 2, 1867 .....	60,000.00	March 22, 1901 (allotment) .....	10,000.00
July 25, 1868 (allotment) .....	20,000.00	June 13, 1902 .....	51,000.00
April 10, 1869 .....	22,275.00	1904 (sales) .....	68.00
April 10, 1869 .....	6,000.00	March 3, 1905 .....	100,000.00
July 11, 1870 .....	50,000.00		<hr/>
		Total .....	2,123,680.87

COMMERCIAL STATISTICS FOR OSWEGO, NEW YORK.

Arrivals and departures of vessels for the year ending December 31, 1904.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.
Steam.....	126	41,884	382	114,915	146	46,967	388	112,807
Sail and barges.....	144	45,594	470	121,837	76	21,851	586	151,519
Total.....	270	87,478	852	236,752	222	68,818	924	264,326

Total arrivals and departures (tonnage, 656,874).....	2,268
Decrease of tonnage, 1904 under 1903..... tons..	26,489
Amount of revenue collected, year ending December 31, 1904.....	\$96,486.91
Value of imports, year ending December 31, 1904.....	\$699,038.00
Value of exports, year ending December 31, 1904.....	\$2,215,969.00
Greatest draft of vessels..... feet..	14
Enrolled tonnage, port of Oswego..... gross tons..	38,426

Receipts by lake.

[Net tons.]

Articles.	1900.	1901.	1902.	1903.	1904.
Lumber.....	69,216	72,744	60,790	49,662	67,020
Poles and railroad ties.....	3,667	563	6,861	332	3,352
Posts, pulp wood, etc.....	919	2,328	26,639	37,004	43,756
Shingles.....	3,361	2,826	8,766	8,510	2,470
Laths.....	917	2,006	4,237	1,189	1,100
Grain.....	11,231	10,690	9,832	10,895	17,745
Clay and sand.....	797			238	
Miscellaneous.....	3,524	107	897	824	671
Total.....	93,632	91,264	118,022	103,654	136,114

Shipments by lake.

[Net tons.]

Articles.	1900.	1901.	1902.	1903.	1904.
Coal.....	425,641	473,713	213,306	629,870	576,072
Merchandise.....		75	2,681	210	315
Total.....	425,641	473,788	215,987	630,080	576,387

About 10,000 passengers arrive and depart by water annually.

R R 7.

IMPROVEMENT OF HARBOR AT CAPE VINCENT, NEW YORK.

REPORT OF OPERATIONS.

The work of breakwater extension under contract with the Buffalo Dredging Company was in progress at the beginning of the fiscal year. By the terms of this contract the work should have been completed December 1, 1903; the time limit was, however, waived for sixty work-

ing days. At the expiration of this additional time the work was not completed.

Some difficulty was experienced from high water during the season of 1904. The 300-foot extension was completed, with the exception of repairing damage to the crib fender, at the close of the fiscal year.

An appropriation of \$30,000 was made by the river and harbor act of March 3, 1905, for continuing this extension, and a project for the expenditure of these funds by building from 180 to 200 feet of the extension was submitted and approved.

A contract was made with John Henrick, of Oswego, N. Y., and the work had been commenced at the close of the fiscal year.

A watchman was on duty during the year to regulate the mooring of vessels to the breakwater.

#### PROPOSED OPERATIONS AND REMARKS.

This breakwater is designed not to protect an anchorage, but for vessels to moor to and to protect vessels moored at the wharves at Cape Vincent, and letters from masters of vessels plying between Lake Ontario and the St. Lawrence River and from vessel owners testify to the value of that part of the breakwater now completed.

The estimate for building this breakwater is \$200,000. Of this amount \$128,000 has been appropriated; the balance required for completion is \$72,000.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$36,789.83
Amount appropriated by river and harbor act approved March 3, 1905..	30,000.00
	<hr/>
	66,789.83
June 30, 1905, amount expended during fiscal year, for works of improvement .....	1,773.88
	<hr/>
July 1, 1905, balance unexpended .....	65,015.95
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	63,107.11
	<hr/>
Amount (estimated) required for completion of existing project .....	72,000.00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	72,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

#### APPROPRIATIONS.

June 3, 1896 .....	\$25,000
March 3, 1899 .....	25,000
June 13, 1902 .....	48,000
March 3, 1905 .....	30,000
	<hr/>
Total .....	128,000

2404 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

CONTRACTS IN FORCE.

For extension of breakwater, dated June 1, 1905.

Name of contractor: John Henrick, Oswego, N. Y.

Rates:

Excavation for foundation, per cubic yard, scow measure .....	\$1. 00
Stone for foundation, per cubic yard .....	1. 35
Timber cribs complete, sunk in place and leveled, per linear foot .....	70. 60
Filling stone in superstructure, per cubic yard .....	1. 40
Concrete blocks, per cubic yard .....	12. 00
Concrete in place, per cubic yard .....	8. 00
Manhole covers, per cover .....	5. 00
Mooring posts, per post .....	25. 00
White oak fender on superstructure, per linear foot .....	. 90

Date of approval: June 10, 1905.

Date of commencement: June 19, 1905.

Date of expiration: September 30, 1906.

COMMERCIAL STATISTICS FOR CAPE VINCENT HARBOR, NEW YORK.

Arrivals and departures of vessels for the year ending December 31, 1904.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Num- ber.	Tons.	Num- ber.	Tons.	Num- ber.	Tons.	Num- ber.	Tons.
Steam .....	23	3,100	272	43,738	29	3,976	277	43,220
Sail and barges .....	9	1,312	82	13,108	9	1,348	82	12,396
Total .....	32	4,412	354	56,846	38	5,324	359	55,616

Total arrivals and departures (tonnage 122,197) .....	783
Increase of tonnage, 1904 over 1903 .....	15,126 tons..
Amount of revenue collected, year ending December 31, 1904 .....	\$25,595. 46
Value of imports, year ending December 31, 1904 .....	\$208,540. 00
Value of exports, year ending December 31, 1904 .....	\$156,585. 00
Greatest draft of vessels (at breakwater, 16 feet) .....	11 feet..
Enrolled tonnage, port of Cape Vincent, N. Y .....	3,739 gross tons..

Receipts by lake and river.

[Net tons.]

Articles.	1900.	1901.	1902.	1903.	1904.
Lumber .....	2,649	2,398	716	635	4,553
Poles, ties, posts, and pulp wood .....	2,655	.....	195	12,188	12,824
Shingles .....	527	739	948	275	909
Laths .....	.....	50	155	25	79
Fish .....	382	438	580	699	611
Stone .....	3,453	.....	.....	.....	.....
Coal .....	.....	350	.....	.....	.....
Miscellaneous .....	1,065	234	1,581	1,894	1,607
Total .....	10,721	4,209	4,175	15,666	20,083

Shipments by lake, groceries and manufactured articles, 225 tons.

## R R 8.

IMPROVEMENT OF SHOALS IN THE ST. LAWRENCE RIVER BETWEEN  
OGDENSBURG, NEW YORK, AND THE FOOT OF LAKE ONTARIO.

## REPORT OF OPERATIONS.

No operations were carried on during the past fiscal year owing to lack of funds and no work is proposed.

## PROPOSED OPERATIONS AND REMARKS.

All the shoals in American waters embraced in the project have been removed to the prescribed depth of 18 feet below the zero of the Oswego gauge (low water).

Shoals A, B, and C, also embraced in the project, are in Canadian waters. Application for permission to remove these shoals was made through the Department of State to the Canadian government, and on December 22, 1899, the necessary permission was granted.

No appropriation was made in the last river and harbor act for this work.

*Money statement.*

Amount (estimated) required for completion of existing project ..... \$40,000.00

## APPROPRIATIONS.

September 19, 1890 .....	\$5,000
July 13, 1892 .....	10,000
August 18, 1894 .....	8,000
June 3, 1896 .....	25,000
March 3, 1899 .....	20,000
Total .....	68,000

## COMMERCIAL STATISTICS.

The commerce involved and interested in this improvement includes that of all the ports of the St. Lawrence River from Lake Ontario to the sea.

## R R 9.

## IMPROVEMENT OF HARBOR AT OGDENSBURG, NEW YORK.

## REPORT OF OPERATIONS.

No dredging was done during the fiscal year. A contract was made with the Daly & Hannan Dredging Company in June, 1905, for the necessary redredging of channels, amounting to approximately 56,000 cubic yards and work will be commenced early in the next fiscal year.

PROPOSED OPERATIONS AND REMARKS.

This harbor fills up with sand and silt and requires frequent dredging to maintain the depth of the project.

It is estimated that there will be required to June 30, 1907, for dredging and office and engineering expenses, \$20,000, and I recommend that this amount be appropriated.

*Money statement.*

July 1, 1904, balance unexpended .....	\$274. 31
Amount appropriated by river and harbor act approved March 3, 1905..	15, 000. 00
	<hr/>
	15, 274. 31
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	143. 69
	<hr/>
July 1, 1905, balance unexpended .....	15, 130. 62
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	14, 000. 00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	20, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS AND ALLOTMENTS.

August 30, 1852 .....	\$3, 000. 00	July 26, 1880 (from appropriations for "Examinations, surveys, and contingencies of rivers and harbors") .....	\$50. 00
March 2, 1867 .....	40, 000. 00	August 2, 1882 .....	10, 000. 00
July 17, 1870 .....	15, 000. 00	July 3, 1884 .....	15, 000. 00
March 3, 1871 .....	25, 000. 00	August 5, 1886 .....	10, 000. 00
June 10, 1872 .....	10, 000. 00	August 11, 1888 .....	15, 000. 00
March 3, 1873 .....	6, 000. 00	September 19, 1890 .....	42, 000. 00
June 23, 1874 .....	6, 000. 00	July 13, 1892 .....	40, 000. 00
March 3, 1875 .....	5, 000. 00	August 18, 1894 .....	20, 000. 00
December 11, 1877 (from appropriation for "Repairs on harbors on northern lakes") .....	5. 56	June 3, 1896 .....	20, 000. 00
September 10, 1879 (from appropriation for "Examinations, surveys, and contingencies of rivers and harbors") .....	300. 00	March 3, 1899 .....	15, 000. 00
		June 13, 1902 .....	20, 000. 00
		March 3, 1905 .....	15, 000. 00
		Total .....	332, 355. 56

CONTRACTS IN FORCE.

*For channel excavation, dated June 14, 1905.*

Name of contractor: The Daly & Hannan Dredging Company, Ogdensburg, N. Y.  
Rates: Dredging and removing material, per cubic yard, scow measure, 25 cents.  
Date of approval: June 29, 1905.  
Date of commencement: July 30, 1905.  
Date of expiration: June 30, 1906.

COMMERCIAL STATISTICS FOR OGDENSBURG, N. Y.

Arrivals and departures of vessels for the year ending December 31, 1904.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.	Num-ber.	Tons.
Steam.....	593	249,386	684	103,069	630	265,901	639	80,699
Sail and barges.....	57	15,645	160	58,024	187	64,489	86	9,460
Total.....	650	265,031	844	161,093	817	330,390	675	90,159

Total arrivals and departures (tonnage 846,673) .....	2,986
Decrease of tonnage, 1904 under 1903 .....	78,726 tons..
Amount of revenue collected on water transportation, year ending December 31, 1904..	\$277,854.27
Value of imports by water, year ending December 31, 1904 .....	\$23,062,924.00
Value of exports by water, year ending December 31, 1904.....	\$5,565,609.00
Greatest draft of vessels.....	16 feet..
Enrolled tonnage, port of Ogdensburg .....	24,148 gross tons..

Receipts by water.

[Net tons.]

Articles.	1903.	1904.	Articles.	1903.	1904.
Coal.....	432,200	245,347	Raw silk.....	2,381	2,568
Flour.....		10,666	Shingles.....	6,056	6,895
Grain.....	198,409	83,616	Transit merchandise.....	33,936	41,830
Hay.....	11,907	3,349	Unclassed merchandise.....	34,358	20,350
Lumber.....	193,535	166,572	Wood pulp.....	5,989	7,712
Lath.....		3,948	Fish.....		803
Live stock.....		495			
Nickel and copper.....	14,748	16,150	Total.....	933,519	610,801

Shipments by water.

[Net tons.]

Articles.	1903.	1904.	Articles.	1903.	1904.
Coal and coke.....	110,086	130,515	Steel rails.....		65,068
Grain.....	52,615	8,372	Transit merchandise <sup>a</sup> .....	52,189	41,830
Machinery.....	19,975	18,905			
Miscellaneous.....	17,491	22,766	Total.....	252,356	287,456

<sup>a</sup> Merchandise in transit through Canada from one port of the United States to another port of the United States.

In addition to the above shipments and receipts there were received 137,544 packages of merchandise under consular seal, the value of which was \$5,341,561; besides this, 7,484 packages merchandise were forwarded from this port to other ports of the United States for immediate transportation without appraisement, which merchandise was of the value of \$274,239.





FOR THE YEAR ENDING DECEMBER 31, 1904.

(Director of customs at San Diego, Cal.)

	Incoming.	Outgoing.
.....	272	259
.....	82	86
.....	354	345
.....	254,090	136,452
.....feet.	264	24
.....tons.	23,686	8,420
.....do.	17,134	106
.....do.	10,037	102
.....do.	480	1,853
.....feet.	28,969,000	966,000

IMPROVED

REPORT  
IN CHARGE  
OTHER

tered and cleared in 1904, 121,686 tons, a decrease of 7.6  
ceeding year.  
have been established or abandoned during the year.

San Diego  
Deep-water  
California

S S 2.

# HARBOR AT SAN PEDRO BAY, CALIFORNIA.

of the breakwater was continued during the year,  
contract dated June 7, 1900, with the California  
pany, of San Francisco, Cal.

GENERAL  
work of  
year ending  
Ver

g of the fiscal year 1,566,093 tons of stone had been  
substructure, which had been raised to mean lower  
about completed for the length of 7,284 feet from  
and 43,276 tons had been placed in the superstructure.  
superstructure work done was the equivalent of 1,400  
wall.

Brig. (n-

fiscal year ending June 30, 1905, 68,209 tons of sand-  
45 tons of granite, a total of 321,454 tons, was placed  
ture, and 28,889 tons of granite in the superstructure.  
total of 1,887,547 tons in the substructure, 72,165 tons  
ecture, and 1,959,712 tons under the contract. During  
the double-track trestle was extended 672 feet, making  
th 8,548 feet. During a severe storm of March 12 and  
feet of this trestle was knocked down by the sea. This  
ended 128 feet, making its total

T.L.

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low water and about completed  
tone has been deposited for the  
has been done on the superstruc-  
encing 628 feet from the westerly  
t of stone placed in the super-  
feet of completed work. While  
ing certain months have fallen  
those months, the total quantity  
ct requirements.

essed it became evident that a  
n length could be built for the

and deposited at sea, completing the contract. A channel 400 feet wide and 26 feet deep was dredged. The cost of this work, including inspection, was \$12,500.96, or \$0.237 per cubic yard.

*Outer bar.*—The channel through the outer bar, dredged to a depth of 26 feet over a width of 271 feet under a contract completed February 13, 1904, shoaled, during a storm March 12 and 13, 1905, to a depth of about 25 feet, which is the maximum draft that can be carried over the bar at the present time. The outer 1,000 feet of the jetty was somewhat beaten down in the same storm.

The present project for the improvement of this harbor is completed, but it is estimated that it will cost about \$15,000 a year to maintain the project depths on the outer bar and middle ground.

The river and harbor act of March 3, 1905, appropriated \$10,000 for maintenance. No work has been done under this appropriation.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$55,871.80
Amount appropriated by river and harbor act approved March 3, 1905. ....	10,000.00
	65,871.80
June 30, 1905, amount expended during fiscal year, for works of improvement .....	55,733.48
	10,138.32
<div style="display: flex; align-items: center;"> <div style="font-size: 3em; margin-right: 10px;">{</div> <div>           Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905.....         </div> <div style="margin-left: 20px; text-align: right;">15,000.00</div> </div>	
<div style="display: flex; align-items: center;"> <div style="font-size: 3em; margin-right: 10px;">{</div> <div>           Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.         </div> </div>	

#### AMOUNT AND DATE OF ALL APPROPRIATIONS FOR THE WORK SINCE 1875.

March 3, 1875.....	\$80,000.00	March 3, 1899.....	\$65,000.00
March 3, 1879.....	1,000.00	June 13, 1902.....	75,000.00
August 11, 1888.....	1,000.00	March 3, 1903.....	192,850.00
September 19, 1890.....	60,500.00	March 3, 1905.....	10,000.00
July 13, 1892.....	50,000.00	Repayment .....	3.26
August 18, 1894.....	50,000.00		
June 3, 1896.....	50,000.00	Total .....	635,353.26

#### ABSTRACT OF ALL CONTRACTS IN FORCE.

##### *Contract for completing jetty.*

Name of contractor: A. E. Babcock.

Contract entered into April 1, 1903; approved April 18, 1903.

Work to begin June 26, 1903; contract to be completed December 26, 1904.

Contract for delivery of 108,108 tons (of 2,000 pounds each) of rubblestone, at \$1.85 per ton.

##### *Contract for dredging on middle ground.*

Name of contractor: A. A. Polhamus.

Contract entered into February 27, 1904; approved March 10, 1904.

Work to begin May 14, 1904; contract to be completed November 2, 1904. Time of completion extended for a reasonable period.

Contract completed February 2, 1905.

Contract for dredging 84,444 cubic yards, at 22½ cents per cubic yard.

## COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1904.

[Furnished by the collector of customs at San Diego, Cal.]

	Incoming.	Outgoing.
<b>Vessels:</b>		
Steam.....	272	259
Sailing.....	82	86
<b>Total.....</b>	<b>354</b>	<b>345</b>
<b>Tonnage.....</b>	<b>254,090</b>	<b>136,452</b>
<b>Draft, greatest.....</b> feet..	<b>26½</b>	<b>24</b>
<b>Merchandise, general.....</b> tons..	<b>23,686</b>	<b>8,420</b>
<b>Coal.....</b> do..	<b>17,134</b>	<b>106</b>
<b>Cement.....</b> do..	<b>10,037</b>	<b>102</b>
<b>Ores.....</b> do..	<b>480</b>	<b>1,853</b>
<b>Lumber.....</b> feet..	<b>28,969,000</b>	<b>965,000</b>

Total amount of freight entered and cleared in 1904, 121,686 tons, a decrease of 7.6 per cent from that of the preceding year.

No lines of transportation have been established or abandoned during the year.

## S S 2.

## DEEP-WATER HARBOR AT SAN PEDRO BAY, CALIFORNIA.

The construction of the breakwater was continued during the year, under continuing contract dated June 7, 1900, with the California Construction Company, of San Francisco, Cal.

At the beginning of the fiscal year 1,566,093 tons of stone had been deposited in the substructure, which had been raised to mean lower low water, and was about completed for the length of 7,284 feet from its westerly end, and 43,276 tons had been placed in the superstructure. The amount of superstructure work done was the equivalent of 1,400 feet of completed wall.

During the fiscal year ending June 30, 1905, 68,209 tons of sandstone and 253,245 tons of granite, a total of 321,454 tons, was placed in the substructure, and 28,889 tons of granite in the superstructure. This makes a total of 1,887,547 tons in the substructure, 72,165 tons in the superstructure, and 1,959,712 tons under the contract. During the fiscal year the double-track trestle was extended 672 feet, making its total length 8,548 feet. During a severe storm of March 12 and 13, 1905, 208 feet of this trestle was knocked down by the sea. This trestle has since been rebuilt and extended 128 feet, making its total length 8,676 feet.

The substructure is to mean lower low water and about completed for a length of 8,212 feet, and some stone has been deposited for the further distance of 288 feet. Work has been done on the superstructure over a length of 2,880 feet, commencing 628 feet from the westerly end of the breakwater. The amount of stone placed in the superstructure is equivalent to about 2,652 feet of completed work. While the quantities of stone delivered during certain months have fallen short of the contract requirements for those months, the total quantity delivered to date is in excess of contract requirements.

As work under this contract progressed it became evident that a breakwater greater than 8,500 feet in length could be built for the

\$2,900,000 which, according to the project, is the limit of cost for the work. Department authority was therefore obtained January 11, 1905, to extend this breakwater to a total length of at least 9,000 feet. The contract is about 70.8 per cent completed.

Eighteen experimental 16,000-pound concrete blocks have been made to test the action of sea water on concrete made from different cements in general use in this market and mixed in different proportions with sand and broken stone. These blocks have not yet been placed on the breakwater.

The work on the breakwater, particularly the substructure, has already advanced far enough to shelter, in stormy weather, a large anchorage area and the entrance to the inner harbor.

The total amount expended on this work to June 30, 1905, is \$1,848,955.01.

The available balance, together with any additional appropriations, should be expended in extending the breakwater under contract and for contingencies.

*Money statement.*

July 1, 1904, balance unexpended .....	\$523, 848. 20
Amount appropriated by sundry civil act approved March 3, 1905 .....	460, 000. 00
	<hr/>
	983, 848. 20
June 30, 1905, amount expended during fiscal year, for works of improve- ment .....	415, 718. 16
	<hr/>
July 1, 1905, balance unexpended .....	568, 130. 04
July 1, 1905, outstanding liabilities .....	46, 742. 51
	<hr/>
July 1, 1905, balance available .....	521, 387. 53
	<hr/> <hr/>
July 1, 1905, amount covered by uncompleted contracts.....	820, 869. 35
	<hr/> <hr/>
Amount (estimated) required for completion of existing project .....	<sup>a</sup> 482, 914. 95
	<hr/> <hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unex- pended July 1, 1905 .....	300, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

AMOUNT AND DATE OF ALL APPROPRIATIONS FOR THE WORK.

June 3, 1896 .....	<sup>b</sup> \$50, 000. 00	March 3, 1905 .....	\$460, 000. 00
July 1, 1898 .....	400, 000. 00		
March 3, 1899 .....	200, 000. 00	Total .....	2, 417, 085. 00
March 3, 1901 .....	146, 000. 00	Received from sale of property .....	. 05
June 28, 1902 .....	311, 085. 00		
March 3, 1903 .....	500, 000. 00		
April 28, 1904 .....	350, 000. 00	Total .....	2, 417, 085. 05

<sup>a</sup> This estimate is for a breakwater about 9,000 feet long (Department authority of January 11, 1905). In previous reports this estimate contemplated a breakwater 8,500 feet long.

<sup>b</sup> Of the appropriation of \$50,000 made by river and harbor act of June 3, 1896, for deep-water harbor at Santa Monica Bay, or San Pedro Bay, California, \$35,555.76 was expended by the Board provided for by said act. For the full report of the Board, with its accompanying documents, see Senate Document No. 18, Fifty-fifth Congress, first session.

## ABSTRACT OF ALL CONTRACTS IN FORCE.

*Contract for construction of breakwater.*

Name of contractor: California Construction Company.

Contract entered into June 7, 1900; approved June 27, 1900.

Work to begin August 4, 1900; contract to be completed December, 1906, provided adequate appropriations are made by Congress.

## Rates:

For substructure stone, \$0.844 per ton of 2,240 pounds.

For superstructure stone, \$3.10 per ton of 2,240 pounds.

For concrete, \$6 per cubic yard.

## Quantities (estimated):

Stone in substructure, 2,135,958 tons; stone in superstructure, 235,275 tons; total, 2,391,233 tons.

Concrete, 2,370 cubic yards.

Total consideration of contract (approximate): \$2,563,046.05.

## COMMERCIAL STATISTICS FOR YEAR ENDING DECEMBER 31, 1904.

For commercial statistics see report of Wilmington Harbor, California.

## S S 3.

## IMPROVEMENT OF WILMINGTON HARBOR, CALIFORNIA.

*The dredge.*—The contract dated October 17, 1903, with Ellicott Machine Company, of Baltimore, Md., for the construction of the 20-inch suction dredge *San Pedro*, which was in force at the beginning of the fiscal year, was completed March 10, 1905. The cost of the dredge, including inspection, was \$99,453.33.

*Launch.*—The emergency contract, entered into June 8, 1904, with H. E. Carse, of San Pedro, Cal., for the construction of the 30-foot gasoline launch *Pedrito*, was completed August 2, 1904, at a cost of \$1,732.50.

*Discharge pipe line for dredge.*—A 20-inch discharge pipe 2,048 feet long and 4 elbows were purchased under emergency contract dated May 12, 1904, with the Baker Iron Works, of Los Angeles, Cal., for \$3,023.08; and 25 rubber sleeves, 21½ inches in diameter and 3 feet long, were purchased under emergency contract dated May 14, 1904, with the New Jersey Car Spring and Rubber Company, of Jersey City, N. J., for \$1,275.

*Work done by day labor.*—The lumber and hardware necessary for the construction of pontoons and barges were delivered, and 24 pontoons and 3 barges were constructed by day labor at a cost, including all labor and material, of \$6,500.62. Four skiffs were built at a total cost of \$154.34. A boat landing 106 feet long was built for \$72.25; two sets of inclined ways, 130 and 135 feet long, respectively, extending westerly from the double work of the east jetty, were built at a cost of \$395.85, and the Government warehouses repaired at a cost of \$66.08.

*Dredging under contract.*—Under the contract entered into November 24, 1902, with Raymond A. Perry, of Oakland, Cal., there was dredged from alongside Deadmans Island (division A) 14,236 cubic yards of material at a cost, including inspection, of \$7,118, completing

the contract August 20, 1904. There had previously been removed 108,734 cubic yards from division A and 249,340 from division B (the entrance above Deadmans Island and along the docks on either side of the inner harbor). The cost of the dredging in division A was 50 cents per cubic yard, and in division B 16 cents per cubic yard. The result of this dredging was the formation of a channel 400 feet wide and 20 feet deep alongside Deadmans Island, and 150 feet wide and 20 feet deep in the channel above Deadmans Island. The dredging along the docks was carried generally to the depth of 20 feet. The governing depth in the outer bar remains about 18 feet.

*Dredging with Government dredge.*—The dredge *San Pedro* was placed in commission April 1, 1905, and at once began dredging in accordance with the approved project. One crew, working nine hours a day, was employed until April 4, 1905, when a second crew was put on and the machine operated sixteen hours a day until April 19, 1905, since which date the dredge has been operated twenty-four hours a day, Sundays and holidays excepted, three crews being employed.

Dredging to a depth of from 20 to 24 feet below mean lower low water was done in front of the wharfs of the Southern California Lumber Company and the Salt Lake Railroad Company, and 227,464 cubic yards of material was removed and deposited behind bulkhead lines on Terminal Island and to the east of the east jetty. This work, including superintendence, cost \$16,105.96, or \$0.07 per cubic yard. The material removed consisted principally of sand intermingled with mud and a small percentage of clay, cobbles, and disintegrated sandstone. During the period of the efficiency test of the dredge, before final acceptance from the contractors, 16,450 cubic yards of material was dredged in front of the Southern California Lumber Company's wharf at a cost, including superintendence, of \$1,682.46, or a cost of \$0.10 per cubic yard.

The amount expended under the existing project to June 30, 1905, is \$251,743.33. So far as material removed is concerned, the dredging project is about 14 per cent completed. The project as a whole is about 45.7 per cent completed.

The river and harbor act of March 3, 1905, appropriated \$100,000 for continuing work under this project, and authorized contracts in the sum of \$150,000 more for completing it. Seventy thousand dollars will be expended in dredging under contract on the bar at the entrance to the harbor, and the remainder will be expended in dredging with Government dredge, or in dredging under contract, as may appear most advisable, and for contingencies.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$191,687.67
Amount appropriated by river and harbor act approved March 3, 1905...	100,000.00
Received from sale of property .....	7.50
	<hr/> 291,695.17
June 30, 1905, amount expended during fiscal year, for works of improvement .....	142,927.68
	<hr/> 148,767.49
July 1, 1905, balance unexpended .....	148,767.49
July 1, 1905, outstanding liabilities .....	2,018.14
	<hr/> 146,749.35
July 1, 1905, balance available .....	<hr/> <hr/> 146,749.35



# APPENDIX S S—REPORT OF CAPTAIN M'KINSTRY. 2415

July 1, 1905, amount covered by uncompleted contracts.....	\$8,542.57
Amount (estimated) required for completion of existing project.....	149,496.68
Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	100,000.00

## APPROPRIATIONS.

March 3, 1871.....	\$200,000.00	September 19, 1890.....	\$34,000.00
June 10, 1872 .....	75,000.00	July 13, 1892.....	51,000.00
March 3, 1873.....	150,000.00	June 3, 1896.....	50,000.00
March 3, 1875.....	30,000.00	June 13, 1902.....	250,000.00
June 18, 1878.....	20,000.00	March 3, 1905.....	100,000.00
March 3, 1879.....	12,000.00		
June 14, 1880.....	35,000.00	Total .....	1,355,000.00
March 3, 1881.....	33,000.00	Received from sale of prop-	
August 2, 1882.....	100,000.00	erty .....	8.50
July 5, 1884.....	50,000.00		
August 5, 1886.....	75,000.00	Aggregate.....	1,355,008.50
August 11, 1888.....	90,000.00		

## ABSTRACT OF ALL CONTRACTS IN FORCE.

### *Contract for dredging.*

Name of contractor: Raymond A. Perry.  
Contract entered into November 24, 1902; approved December 11, 1902.  
Work to begin in division A, February 14, 1903; in division B, March 16, 1903.  
Contract to be completed, for division A, October 14, 1903; for division B, November 26, 1903. Date of completion extended to September 14, 1904.  
Contract for dredging 120,000 cubic yards at 50 cents per cubic yard in division A, and 250,000 cubic yards at 16 cents per cubic yard in division B.

### *Contract for construction of dredge.*

Name of contractor: Ellicott Machine Company.  
Contract entered into October 17, 1903; approved November 6, 1903.  
Work to begin December 12, 1903. Contract to be completed May 12, 1904. Date of completion extended for a reasonable period. Completed March 10, 1905.  
Contract for construction of a 20-inch suction dredge for \$98,400.

### *Contract for furnishing hardware for pontons.*

Name of contractor: H. E. Carse.  
Contract entered into May 6, 1904; approved June 3, 1904.  
Delivery to be made July 24, 1904.  
Amount of contract, \$1,049.09.

### *Contract for furnishing discharge pipe.*

Name of contractor: Baker Iron Works.  
Contract entered into May 12, 1904; approved June 3, 1904.  
Delivery to be made August 8, 1904. Date of completion extended to August 22, 1904.  
Contract for furnishing 2,048 feet of 20-inch discharge pipe and 4 elbows for \$3,023.08.

### *Contract for furnishing rubber sleeves.*

Name of contractor: New Jersey Car Spring and Rubber Company.  
Contract entered into May 14, 1904; approved June 17, 1904.  
Delivery to be made August 22, 1904.  
Contract for furnishing 25 rubber sleeves, 21½ inches diameter, 3 feet long, for \$1,275.

*Emergency contract for launch.*

Name of contractor: H. E. Carse.  
Contract entered into June 8, 1904.  
Work to begin June 8, 1904; contract to be completed July 20, 1904. Date of completion extended to August 3, 1904.  
Contract for gasoline launch, 30 feet long, 7-foot beam, with 16-horsepower "Standard" engine, for \$1,732.50.

*Emergency contract for furnishing gasoline.*

Name of contractor: William S. Miller.  
Contract entered into December 1, 1904.  
Deliveries to begin December 1, 1904.  
Contract to be completed December 1, 1905.  
Contract for furnishing 3,000 gallons of gasoline for \$375.

*Emergency contract for furnishing lubricating oils, etc.*

Name of contractor: William S. Miller.  
Contract entered into December 14, 1904.  
Deliveries to begin December 20, 1904.  
Contract to be completed December 20, 1905.  
Contract for furnishing lubricating oils, etc., for dredge for \$1,410.70.

*Contract for furnishing crude oil.*

Name of contractor: William S. Miller.  
Contract entered into December 30, 1904; approved January 19, 1905.  
Deliveries to begin January 31, 1905.  
Contract to be completed January 31, 1906.  
Contract for furnishing 16,000 barrels of crude oil for fuel for dredge. Amount, \$9,920.

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1904.

[Furnished by the collector of customs at Los Angeles, Cal.]

	Incoming.	Outgoing.
Vessels:		
Steam.....	948	939
Sailing.....	382	382
Total.....	1,330	1,321
Tonnage.....	515,047.0	504,020.0
Draft, greatest:		
Outer harbor.....feet..	23.6	20.5
Inner harbor.....do....	21.0	20.5
Merchandise, general.....tons..	11,715.0	11,149.0
Asphalt.....do....	583.0	1,743.0
Coal.....do....	8,262.0	
Grain.....do....	15,649.0	
Steel rails.....do....	11,760.0	
Fish plates.....do....	672.0	
Pig iron.....do....	767.0	
Fertilizers.....do....	168.0	
Lumber.....feet..	391,839,082.0	
Crude oil.....barrels..	22,340.0	200.0
Sheep.....	6,372.0	

Of the above amounts, 13,400 tons was foreign commerce.  
Total amount of freight entered and cleared in 1904, 845,220 tons, an increase of 9.9 per cent over the preceding year.  
No lines of transportation have been established or abandoned during the year.

# APPENDIX S S—REPORT OF CAPTAIN M'KINSTRY. 2417

REPORT OF MR. R. A. CRAWFORD, ASSISTANT ENGINEER.

SAN PEDRO, CAL., July 8, 1905.

CAPTAIN: I have the honor to submit a statement showing distribution of accounts and expenditures for labor, plant, material, and supplies incurred in the improvement of Wilmington Harbor, California, during the fiscal year ending June 30, 1905, and the work accomplished.

## Statement of expenditures.

Routine office work (labor).....		\$1,474.97
Care of plant and property (labor) .....		820.80
Surveys:		
Labor .....	\$342.50	
Supplies .....	9.50	
		352.00
Tools and other property made and purchased:		
Labor .....	301.00	
Purchases .....	392.03	
		693.03
New plant:		
Launch <i>Pedrito</i> .....	1,732.50	
Labor .....	3,600.29	
Material .....	7,248.45	
		12,581.24
Building dock at United States engineer warehouses:		
Labor .....	45.00	
Material .....	27.25	
		72.25
Repairing warehouses:		
Labor .....	35.70	
Material .....	30.38	
		66.08
Building inclined ways:		
Labor .....	215.71	
Material .....	180.14	
		395.85
Superintendence and inspection, dredging in division A, Perry contract (labor).....		320.00
Superintendence and inspection dredge <i>San Pedro</i> (labor).....		1,648.92
Testing dredge <i>San Pedro</i> :		
Labor .....	\$1,388.46	
Supplies .....	294.00	
		1,682.46
Towing and dispatch work, launch <i>Pedrito</i> :		
Labor .....	710.67	
Supplies .....	167.68	
		878.35
Alterations and repairs to dredging plant:		
Labor .....	1,562.63	
Material .....	869.89	
		2,432.52
Operating dredge:		
Labor .....	6,452.13	
Supplies .....	3,632.41	
		10,084.54

## WORK ACCOMPLISHED.

*Dredge San Pedro*.—This 20-inch suction dredge, which was under construction at the close of the last fiscal year by the Ellicott Machine Company, of Baltimore, Md., was completed March 10, 1905; on March 13, 1905, it was turned over to the United States for the tests prescribed in the specifications. These tests continued until March 25, 1905; their results fulfilled all the requirements and were very satisfactory. After the contractors had made a number of minor alterations and repairs as a result of the final inspection made at the close of these tests, the dredge was accepted from them on March 30, 1905. The cost of the work on dredge during the fiscal year, including superintendence and inspection charges, was \$82,086.12.

*Auxiliary floating plant.*—The gasoline launch *Pedrito*, which was under construction at the close of the last fiscal year by H. E. Carse, of San Pedro, Cal., was completed August 2, 1904, and turned over to the United States. It has a length over all of 30 feet 1½ inches, beam of 7 feet, and depth of 3 feet 3 inches, and is propelled by a 16-horsepower "Standard" engine. On test, the speed attained in quiet water was 9.32 statute miles per hour. This launch is in constant attendance upon the dredge and is used for towing pontoons with discharge pipe, and lighters of oil and water, delivering material and supplies, and for dispatch work. It has proven a very valuable acquisition to the plant.

A small force of carpenters, calkers and laborers was organized July 7, 1904, and employed until October 31, 1904, in constructing, by hired labor, the following pieces of floating plant: 9 pontoons, each 35 feet by 10 feet by 3 feet; 15 pontoons, each 21 feet 3 inches by 10 feet by 3 feet; 1 water boat, 34 feet 9 inches by 10 feet by 4 feet 6 inches; 1 oil boat, 34 feet 9 inches by 10 feet by 4 feet 6 inches; 1 derrick boat, 29 feet 6 inches by 10 feet 7 inches by 3 feet 10 inches.

The total cost of the above, including all labor and materials, was \$6,500.62.

Four skiffs were built during the months of January and February, by hired labor, at a total cost for labor and materials of \$154.34.

*Building dock.*—A dock 106 feet long, extending out from the United States engineer warehouses on east jetty, over the sand spit, was built to facilitate the handling of material and supplies for the dredge. The two old unserviceable lighters, Nos. 2 and 3, were used for the purpose, being placed end-on on substantial supports above a stage of high water and connected with the jetty. The total cost of this work, including labor and material, was \$72.25.

*Repairing warehouses.*—The two small United States engineer warehouses on east jetty, which were damaged September 5, 1904, by heavy swell from the southeast, were repaired at a total cost for labor and material of \$66.08.

*Building inclined ways.*—Two sets of inclined ways, 130 and 135 feet long, respectively, extending westerly from the double work of east jetty just northward of the United States engineer dock, and having a slope of about 1 on 12, were built by hired labor during the month of November, 1904, on which could be pulled out and repaired, when necessary, any of the pieces of floating plant attendant upon the dredge. Their cost, including all labor and material, was \$395.85.

*Dredging.*—Dredging alongside of Deadmans Island (division A) was continued under a contract with Raymond A. Perry and was completed August 20, 1904; 14,236 cubic yards of material were removed during the fiscal year. The contract price was 50 cents per cubic yard; the total cost, including superintendence and inspection charges and surveys during the fiscal year, and retained percentages during period of contract, was \$15,832.15. The material was sand, clay, and fragmental rock in varying proportions. Soundings taken over the dredged area after the completion of the contract showed a minimum depth of 20 feet below mean lower low water throughout the entire division. The outer bar at entrance to harbor carried a depth of 18 feet below mean lower low water at the close of the fiscal year. It might be stated that this depth is for a very short distance, scarcely more than 50 feet.

During the efficiency test and final inspection of the dredge *San Pedro*, prior to its acceptance by the United States, 16,450 cubic yards of material were removed from the harbor within the lines of the project, northward of the northerly end of the Southern California Lumber Company's wharf, and deposited behind a bulkhead built by the Salt Lake Railway Company across the slough abreast of Terminal Island station. The total cost for labor employed, including superintendence, and for the fuel, water, and other supplies expended on account of this work, was \$1,682.46, or at an average cost of 10½ cents per cubic yard of material handled.

The dredge *San Pedro* was placed in commission April 1, 1905, and at once began the dredging of the inner harbor in accordance with the approved project. One crew, working nine hours a day, was employed until April 4, when a second crew was put on and the machine operated sixteen hours a day. A third crew was put on on April 19, since which date the dredge has been operated twenty-four hours a day. Sundays and holidays excepted. A channel alongside the northerly 275 feet of the Southern California Lumber Company's wharf, and an approach to same from the north of 275 feet, were dredged. Both had an average width of 170 feet, and were carried to a depth of about 24 feet below mean lower low water. This work continued until April 22, when 40,865 cubic yards of material had been removed. It was pumped through 1,700 to 2,000 feet of pipe, and placed in the slough and on the flats behind the previously mentioned bulkhead abreast of Terminal Island station. The material consisted of sand, shell, and a small per cent of mud, very compact and hard to handle with the cutter.

On April 24 the *San Pedro* was moved to the northerly end of the Salt Lake Railway Company's wharf, at East San Pedro, Cal., where the needs of commerce were more imperative, and began working south along their wharf. With the exception of sixteen days, May 15 to 30, when the dredge was laid up undergoing some general alterations and repairs, and other short stops from time to time to make minor repairs incident to the work, dredging in this locality has been continuous and was still in progress at the close of the fiscal year. A cut along the wharf and easterly pierhead line, having a total length of 1,650 feet and width of 170 feet, was made. A second cut was begun on the middle ground abreast of the first and carried south 220 feet for a width of 170 feet. With few exceptions the area covered has been carried to a depth of 24 to 26 feet below mean lower low water; 186,599 cubic yards of material were removed, pumped through 600 to 1,575 feet of discharge pipe, and deposited east of the east jetty and northward of the stone spur. This material consisted principally of sand intermingled with shell and a small per cent of clay, cobbles, and disintegrated sandstone. The following statement shows the cost of dredging since the *San Pedro* has been in commission:

Routine office work, labor .....	\$673. 33
Care of plant and property, labor.....	180. 00
Surveys, labor and supplies.....	155. 63
Towing and dispatch work, labor, fuel, and supplies.....	316. 00
Alterations and repairs to dredging plant, labor and material .....	2, 432. 52
Operating dredge, including superintendence and labor charges, fuel, fresh water, lubricants, and all other supplies.....	10, 084. 54
Deterioration of plant and property, estimated.....	2, 263. 94
Total cost of dredging, April 1 to June 30, 1905.....	16, 105. 96

Total amount of material removed, 227,464 cubic yards.

Cost per cubic yard, \$0.0708.

Very respectfully, your obedient servant,

R. A. CRAWFORD,  
Assistant Engineer.

Capt. C. H. McKINSTRY,  
Corps of Engineers.

#### S S 4.

#### IMPROVEMENT OF SAN LUIS OBISPO HARBOR, CALIFORNIA.

No work was done during the fiscal year.

The project is about 50 per cent completed.

On May 24, 1905, a contract was entered into with the City Street Improvement Company, of San Francisco, Cal., for the expenditure of the \$25,000 appropriated by river and harbor act of March 3, 1905. The contract calls for the delivery in the breakwater of 8,868 tons of stone, at \$2.65 per ton, and this stone will be placed in extension of the existing work and to the height of high water.

The approved project for this breakwater contemplates a structure rising to 6 feet above high water. Further appropriations will be expended in extending the breakwater to its full height and length.

#### *Money statement.*

July 1, 1904, balance unexpended.....	\$667. 39
Amount appropriated by river and harbor act approved March 3, 1905..	25, 000. 00
	25, 667. 39
June 30, 1905, amount expended during fiscal year, for works of improvement .....	169. 79
July 1, 1905, balance unexpended.....	25, 497. 60

# 2420 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

July 1, 1905, amount covered by uncompleted contracts.....	\$23, 500. 00
Amount (estimated) required for completion of existing project .....	263, 659. 05
<div> <div> Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....</div> <div>100, 000. 00</div> </div> <div> Submitted in compliance with requirements of sundry civil act of June 4, 1897. </div>	

## APPROPRIATIONS.

August 11, 1888 .....	\$25, 000. 00	March 3, 1905 .....	\$25, 000. 00
September 19, 1890 .....	40, 000. 00		
July 13, 1892 .....	30, 000. 00	Total .....	305, 000. 00
August 18, 1894 .....	40, 000. 00	Received from sale of prop-	
June 3, 1896 .....	40, 000. 00	erty .....	. 95
March 3, 1899 .....	55, 000. 00		
June 13, 1902 .....	50, 000. 00	Total .....	305, 000. 95

## ABSTRACT OF ALL CONTRACTS IN FORCE.

### Contract for continuing construction of breakwater.

Name of contractor: City Street Improvement Company.  
Contract entered into May 24, 1905; approved June 19, 1905.  
Work to begin August 26, 1905; contract to be completed January 26, 1906.  
Contract for delivery of 8,868 tons (of 2,000 pounds each) of rubble stone, at \$2.65 per ton.

## COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1904.

[Furnished by the Pacific Coast Steamship Company.]

	Incoming.	Outgoing.
Vessels:		
Steam .....	259	259
Sailing .....		
Total .....	259	259
Tonnage .....	148, 718	148, 718
Draft, greatest .....	21 1/2	21 1/2
Merchandise, general .....	11, 898	1, 403
Coal .....	354	20
Lumber .....	7, 140, 412	
Grain .....	145	26, 770
Bituminous rock .....		2, 008
Dairy products .....	7	192
Live stock .....	3	8
Crude oil .....		147, 511

Total amount of freight entered and cleared in 1904, 81,620 tons; an increase of 35.4 per cent over that of the preceding year.

No lines of transportation have been established or abandoned during the year.

## APPENDIX T T.

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### IMPROVEMENT OF RIVERS AND HARBORS IN CALIFORNIA TRIBUTARY TO AND NORTH OF SAN FRANCISCO BAY.

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**REPORT OF COL. W. H. HEUER, CORPS OF ENGINEERS, OFFICER IN  
CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905, WITH  
OTHER DOCUMENTS RELATING TO THE WORKS.**

#### IMPROVEMENTS.

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|--|--|
| 1. Alviso Harbor, California.                          | 8. Mokelumne River, California.                |
| 2. Redwood Creek, California.                          | 9. Sacramento and Feather rivers, California.  |
| 3. San Francisco Harbor, California.                   | 10. Petaluma Creek and Napa River, California. |
| 4. Oakland Harbor, California.                         | 11. Humboldt Harbor and Bay, California.       |
| 5. San Pablo Bay, California.                          |  |
| 6. San Joaquin River, California.                      |  |
| 7. Improving Stockton and Mormon channels, California. |  |
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UNITED STATES ENGINEER OFFICE,  
*San Francisco, Cal., July 15, 1905.*

GENERAL. I have the honor to transmit herewith the annual reports of river and harbor works under my charge for the fiscal year ending June 30, 1905.

Very respectfully, your obedient servant,

W. H. HEUER,  
*Colonel, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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#### T T I.

#### IMPROVEMENT OF HARBOR AT ALVISO, CALIFORNIA.

A description of Alviso Harbor, Slough, and vicinity is printed in the Annual Report of the Chief of Engineers for 1891, page 2964.

In the past fiscal year the slough was redredged. Contract was let to Marshall C. Harris, at 17 cents per cubic yard, place measurement, for the removal of material from the slough, and 35 cents per cubic yard for removal of hardpan from the turning basin at the lower end of the village of Alviso. Dredging under this contract was commenced on January 30, 1905, and completed on June 5, 1905. A total of 134,960 cubic yards was dredged from the channel at a cost of \$22,943.20, and 6,954 cubic yards were removed from the turning basin



at a cost of \$2,433.90. The amount paid the contractor for the entire work was \$25,377.10. The channel obtained was from 70 to 100 feet in width, 7 to 8 feet in depth at low water, down to hardpan, and extended from the lumber wharf at the upper end of Alviso Slough to its mouth. The total length of channel dredged over was 27,900 feet, or 5.28 miles. The turning basin made has a width of about 150 feet, a length of 220 feet, and a depth of 7 feet at low water.

There has been but very little commerce at this locality in the past year. Statistics asked for were not furnished.

After the recent dredging was completed the unexpended balance of funds on hand, viz, \$1,849.50, was, in compliance with act of Congress of March 3, 1905, turned into the Treasury. As \$1,856.53 balance of the appropriation still remained undrawn in the United States Treasury at Washington, D. C., the total amount of the original appropriation not used was \$3,706.03.

On account of the small amount of commerce and navigation using Alviso Slough and Harbor, notwithstanding the fairly good channel which has been available for several years, it is my opinion that this stream is not now worthy of further improvement by the Government.

#### *Money statement.*

July 1, 1904, balance unexpended.....	\$30,051.13
June 30, 1905, amount expended during fiscal year:	
For works of improvement.....	\$26,345.10
Amount covered into surplus fund.....	3,706.03
	<hr/> 30,051.13

#### APPROPRIATIONS FOR IMPROVING HARBOR AT ALVISO, CALIFORNIA.

March 3, 1899.....	\$48,000
Received from surety of failing contractor.....	10,000
Total.....	<hr/> a 58,000

#### CONTRACTS IN FORCE.

*Contract dated November 5, 1904, for dredging about 125,800 cubic yards of material from Alviso Slough, California.*

Name of contractor: Marshall C. Harris.  
Rate: 17 cents and 35 cents per cubic yard.  
Date of approval: November 22, 1904.  
Work commenced: January 30, 1905.  
Work completed: June 5, 1905.

#### COMMERCIAL STATISTICS.

Although application was made to all persons known to be interested in Alviso Slough, no statistics of commerce during the year 1904 could be obtained. The small steamer which formerly ran on the slough did not run during the year. One or two small schooners are reported to have taken cargoes of lumber and bark into the slough during the year, but no statement of their size or of the amount of the cargoes could be obtained.

The commerce on this slough, however, is known to be very insignificant.

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<sup>a</sup>Covered into surplus fund, \$3,706.03.

## T T 2.

## IMPROVEMENT OF REDWOOD CREEK, CALIFORNIA.

The work for which Congress by act of June 13, 1902, appropriated \$8,400 for the improvement of this creek was placed under contract in 1903 and completed on July 15 of that year. It resulted in a good channel across the middle ground, fully 5 feet below low-water level and 100 feet least width, as well as the completion of the dredging in front of the city wharf. The total volume of the material dredged was 72,154 cubic yards. The contract price for dredging was 11 cents per cubic yard, place measurement. It is reported by the tannery company that the dredged channel has again shoaled. No survey has been made since immediately after the completion of the work. As there is no tidal basin above the channel it can not be expected to be self-maintaining, but is at present sufficient for all the existing requirements of commerce.

No further appropriation in the near future for this work is believed to be necessary.

*Money statement.*

July 1, 1904, balance unexpended .....	\$357.34
July 1, 1905, balance unexpended .....	357.34

Amount (estimated) required for completion of existing project.... Indeterminate.

## APPROPRIATIONS FOR IMPROVING REDWOOD CREEK, CALIFORNIA.

July 5, 1884.....	\$3,000
August 5, 1886 .....	5,000
August 11, 1888 .....	7,400
September 19, 1890.....	8,000
June 13, 1902 .....	8,400
Total .....	31,800

## COMMERCIAL STATISTICS.

The commerce of Redwood Creek is carried on small scow schooners, which run regularly into the creek, and two small steamers, which make occasional trips. The following is a statement of the business done in 1904, as furnished by the shippers:

	Tons.
Building material received and shipped.....	1,390
Supplies for tannery received .....	13,387
Tannery products shipped .....	1,128
Salt shipped .....	3,000
Total .....	18,905

## T T 3.

## IMPROVEMENT OF HARBOR AT SAN FRANCISCO, CALIFORNIA.

All work was completed in December, 1903.

The work in this harbor contemplated the removal of Arch rock, the two Shag rocks, and Blossom rock, all to a depth of 30 feet below the

level of the lower low tides. The work was placed under continuing contract in 1899 for Arch and Shag rocks and was completed in April, 1903. Contract for the removal of Blossom rock was made in November, 1902, and completed on December 28, 1903. This rock was removed by surface blasting and then dredging the broken rock into deep water alongside, at a cost of \$49,228.64. The total cost of removing all the rocks to a depth of 30 feet was \$316,529.68. As all the work for which appropriations were made and authorized has been completed, no further appropriations are necessary.

Assistant Engineer H. L. Demeritt was in charge of the work and rendered excellent service.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$3,470.32
July 1, 1905, balance unexpended .....	3,470.32

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#### APPROPRIATIONS.

March 3, 1899.....	\$100,000
June 6, 1900.....	170,000
March 3, 1903.....	50,000
Total.....	320,000

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#### COMMERCIAL STATISTICS.

The tonnage of the vessels that arrived at and sailed from the port of San Francisco during the calendar year 1904 was reported by the secretary of the Merchants Exchange of San Francisco as 6,587,919 tons. This includes only commercial vessels and transports, and not the large number of other United States and foreign government vessels which visit this port. There are also a number of large ferryboats which ply between San Francisco and other points on the bay and carry much freight and enormous numbers of passengers. There is also a large fleet of small steam and sail boats carrying freight to the various landings on and adjacent to the bay.

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#### T T 4.

#### IMPROVEMENT OF OAKLAND HARBOR, CALIFORNIA.

During the past year work has been continued under a dredging contract with Warren H. Pomeroy, at a cost of 8.44 cents per cubic yard. The quantity of material pumped by the dredge and placed ashore in the year aggregated 1,192,331 cubic yards, of which about 20 per cent was extraordinarily hard digging. The maximum output of the dredge was, in the month of April, 1905, in the west end of Brooklyn channel, where the digging was principally soft mud, discharged through a pile line 3,600 feet in length. It amounted to 332,896 cubic yards. Dredging has been confined entirely to the inner harbor, and has resulted in completing a channel 300 feet wide and 12 feet least depth around the south side of the tidal basin, and very nearly completing one 300 feet wide and 8 feet least depth on the north side of the tidal basin.

Much work has also been done in the vicinity of the bridges in Oakland Harbor. The result is that there is now a channel 400 feet wide and 20 feet least depth from San Francisco Bay to Chestnut street; thence a channel 300 feet wide and 17 feet deep to the west end of the tidal basin; one of 12 feet depth around the south side of this basin, and one of 8 feet depth (to be completed in July, 1905) around the north side of the basin.

During the progress of the work in the latter part of 1904 a new type of cutter was devised for use on the suction dredge. In cutting through stiff clay and hardpan, the latter practically sandstone, with this improved apparatus, the average monthly output was 40,000 cubic yards per month.

In addition to the dredging, some repairs were made to the timber bulkhead lining on one side of the Sausal Creek canal, which was leaking. This was done by hired labor and purchase of material in open market, at a total cost of \$94.65. Some flooring, badly worn from heavy traffic, was also renewed in the Fruitvale Avenue Bridge across the tidal canal, at a cost of \$32.

Borings have been made throughout the channel, which it is proposed to deepen to 25 feet, for which provision was made by Congress in the river and harbor act of March 3, 1905, which appropriated \$100,000 and authorized continuing contracts for \$250,000 additional for producing a channel 300 feet wide and 25 feet deep at low water, to extend from San Francisco Bay to Fallon street, Oakland, in accordance with project No. 3, estimated to cost \$968,203, submitted in 1900, and printed in the Annual Report of the Chief of Engineers for 1901, page 3449.

The money appropriated and authorized for contracts is believed to be sufficient to complete that portion of the work, viz, the channel 300 by 25 feet to Fallon street. The amount authorized, but not yet appropriated, viz, \$250,000, can all be advantageously expended in the fiscal year ending June 30, 1907.

The work has been in charge of Assistant Engineer L. J. Le Conte, who has been very attentive to his duties.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$153, 838. 80
Amount appropriated by river and harbor act approved March 3, 1905..	100, 000. 00
	<hr/>
	253, 838. 80
June 30, 1905, amount expended during fiscal year, for works of improvement .....	96, 271. 21
	<hr/>
July 1, 1905, balance unexpended .....	157, 567. 59
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	20, 681. 28
	<hr/>
Amount (estimated) required for completion of existing project .....	250, 000. 00
	<hr/>
[ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	
	250, 000. 00

## APPROPRIATIONS.

June 24, 1874.....	\$100,000	August 18, 1894.....	\$100,000
March 3, 1875.....	100,000	June 3, 1896.....	20,000
August 14, 1876.....	75,000	June 4, 1897.....	200,000
June 18, 1878.....	80,000	July 1, 1898.....	133,000
March 3, 1879.....	60,000	March 3, 1899.....	133,000
June 14, 1880.....	60,000	June 6, 1900.....	180,000
March 3, 1881.....	60,000	June 13, 1902.....	100,000
August 2, 1882.....	200,000	March 3, 1903.....	131,000
July 5, 1884.....	139,600	April 28, 1904.....	19,000
August 5, 1886.....	60,000	March 3, 1905.....	100,000
August 11, 1888.....	350,000		
September 19, 1890.....	250,000	Total .....	2,800,600
July 13, 1892.....	150,000		

## CONTRACTS IN FORCE.

*Contract dated December 27, 1902, for dredging about 2,655,400 cubic yards of material from Oakland Harbor, California.*

Rate: 8.44 cents per cubic yard.

Name of contractor: Warren H. Pomeroy.

Date of approval: January 8, 1903.

Work commenced: February 17, 1903.

Work completed: Still in progress; will probably be completed by August 1, 1905.

## COMMERCIAL STATISTICS.

The following statements show the traffic by vessels and ferryboats which passed through the channel way between the jetties during the calendar year 1904.

The classified freight carried by merchant vessels during the year comprised:

	Tons.
Coal, wood, coke, and oil .....	280,127
Hay, grain, flour, etc .....	21,000
Lumber .....	210,000
Building materials .....	557,637
Miscellaneous .....	117,227
Total .....	1,185,991

It is impossible to classify the freight carried by the ferries, which includes all the overland freight carried out of San Francisco by the Southern Pacific Company, whose freight slip is situate at Peralta street, just inside the jetty channel. The total amount of freight carried by the ferries during the year 1904 amounted to 3,522,681 tons. The following statement shows the amounts landed at and shipped from the different ferry slips:

	Tons.
Peralta street slip .....	3,024,066
Broadway slip .....	279,216
Narrow gauge slip .....	219,399
Total .....	3,522,681

## T T 5.

## IMPROVEMENT OF SAN PABLO BAY, CALIFORNIA.

The project for this improvement, which requires a channel 300 feet wide, 30 feet deep at low tide, and a little more than 5 miles in length, estimated to cost \$381,000, was adopted by Congress on June 13, 1902,

by appropriating \$100,000 and authorizing continuing contracts to a limit of \$381,000.

Contract was let at 11.44 cents per cubic yard and approved in 1902. Work was commenced in February, 1903. Up to December 24, 1903, the contractor removed only about 196,000 cubic yards of material. As this was only about 20 per cent of the requirements, the contract was annulled. Bids were again advertised for on March 2, 1904. They were opened and rejected. The work was readvertised and bids opened on May 24, 1904, and contract made in June with the North American Dredging Company, of San Francisco, Cal., at the rate of 14.48 cents per cubic yard, place measurement. This was approved on July 19, 1904, and work was commenced on August 24, 1904. Two clam-shell dredges have generally been at work since, and up to June 30, 1905, had removed and properly deposited 1,110,176 cubic yards of material, which furnished a channel at least 30 feet in depth and 120 feet in width throughout the length of the shoal. This channel is now being increased to its full width of 300 feet.

Of the total amount of excavation 992,370 cubic yards were removed from above the 30-foot plane of depth and 117,806 cubic yards from between the 30 and 31 foot planes. About 48 per cent of the work is completed. The sum of \$300,000 has been appropriated, and \$81,000 is yet required. If the present rate of progress be continued the work should be completed about July 1, 1906.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$294, 798. 40
June 30, 1905, amount expended during fiscal year, for works of improvement .....	120, 327. 58
July 1, 1905, balance unexpended .....	174, 470. 82
July 1, 1905, amount covered by uncompleted contracts.....	217, 039. 00
Amount (estimated) required for completion of existing project .....	81, 000. 00
<div> <div> Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....</div> <div>81, 000. 00</div> </div> Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

#### APPROPRIATIONS.

June 13, 1902 .....	\$100, 000
March 3, 1903.....	200, 000
Total .....	300, 000

#### CONTRACTS IN FORCE.

*Contract dated June 24, 1904, for dredging about 2,285,000 cubic yards of material from San Pablo Bay, California.*

Rate: 14.48 cents per cubic yard.

Name of contractor: North American Dredging Company.

Date of approval: July 19, 1904.

Work commenced: August 24, 1904.

Work to be completed: August 23, 1906. Work in progress.



## T T 6.

## IMPROVEMENT OF SAN JOAQUIN RIVER, CALIFORNIA.

A description of this river, its original condition, and plan for its improvement are printed in the Annual Report of the Chief of Engineers for 1896, pages 3189-3190.

In the early part of 1905 very heavy rains occurred, and the Calaveras River, which empties mainly into the San Joaquin through Stockton and Mormon channels, rose rapidly, deposited sediment and formed a bar in the Stockton channel, at the junction of Stockton and Mormon channels, which prevented steamboats from entering Stockton for several days. Survey was immediately made to determine the extent of the obstruction, and emergency contracts were entered into early in February to remove the bar. The conditions were such that there was little room on either bank of Stockton channel to deposit much dredged material. The most important part of the work had to be done by a pump or suction dredge, and with such machine the material had to be pumped and secured behind levees in the low flat lands bordering on Mormon channel. For purposes of economy and to expedite matters two separate contracts for dredging were made. One which could be done, over a section 5,200 feet long, containing 89,927 cubic yards, by a clam-shell dredge was awarded at 14 cents per cubic yard, place measurement; the other, over a section 2,100 feet in length, containing 64,953 cubic yards, suction dredge work, was let at 14½ cents per cubic yard. Dredging was commenced on February 28 and completed on May 16, 1905, and resulted in obtaining a channel 7,300 feet in length, 100 feet in width, and 9 feet deep at low water. A slight shoaling of less than a foot in height has since occurred in parts of this channel. The total cost of the dredging was \$22,170.35.

In addition to the dredging in Stockton channel, repairs had to be made to the brush and rock weir, which had been breached on its left flank, across Lairds Slough. The work was done by contract, made on September 7, 1904, with Thomas Thomson. Work was commenced on October 1 and completed on December 6, 1904, at a cost of \$3,872.83. It consisted of driving 51 piles at \$15 each, 1,232 linear feet of piles at 60 cents per foot, 1,200 feet of lumber at \$60 per thousand feet, 305.5 cubic yards of gravel at \$2.25 per yard, 1,489 cubic yards of brush at 75 cents per cubic yard, and 92.5 tons of rock at \$6 per ton.

The original cost of this weir, built in September, 1891, was \$11,994.38. It was repaired in 1894 at a cost of \$4,251.10, and again in 1902 at a cost of \$7,431.47. The total cost of the weir, exclusive of engineering expenses, has been \$27,549.78.

With the exception of a few days' interruption to navigation, the river has been in good condition and depths have been well maintained.

The bar which annually forms in Stockton channel will continue to be troublesome until Mormon channel has been diverted through the proposed canal passing to the northward and eastward of the city of Stockton. Money for this improvement is available, but the work can not be undertaken until the right of way has been furnished the Government free of charge.

To keep open a channel in Stockton channel and maintain the weirs at Lairds Slough and Paradise Cut, it is estimated that \$35,000 can be advantageously expended on this river for the fiscal year ending June 30, 1907.



*Money statement.*

July 1, 1904, balance unexpended .....	\$37,331.37
Amount appropriated by river and harbor act approved March 3, 1905. ....	20,000.00
	<hr/> 57,331.37
June 30, 1905, amount expended during fiscal year, for works of improvement .....	29,117.60
	<hr/> 28,213.77
July 1, 1905, balance unexpended .....	28,213.77
Amount (estimated) required for completion of existing project. Indeterminate.	<hr/> <hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	35,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

## APPROPRIATIONS.

August 14, 1876 .....	\$20,000	August 18, 1894 .....	\$50,000
June 14, 1880 .....	20,000	June 3, 1896 .....	57,750
March 3, 1881 .....	40,000	March 3, 1899 .....	20,000
August 2, 1882 .....	40,000	June 13, 1902 .....	18,000
July 5, 1884 .....	20,000	Allotted from act of April 28, 1904 .....	35,170
August 5, 1886 .....	18,750	March 3, 1905 .....	20,000
August 11, 1888 .....	25,000		
September 19, 1890 .....	75,000		
July 13, 1892 .....	65,000	Total .....	524,670

## CONTRACTS IN FORCE.

*Contract dated September 7, 1904, for repairing dam at Lairds Slough, San Joaquin River, California.*

Name of contractor: Thomas Thomson.

Rate: 60 cents per linear foot for piles, \$15 each for driving piles, 75 cents per cubic yard for brush fascines in place, \$2.25 per cubic yard for gravel in place, \$60 per thousand feet for Oregon pine lumber in place, and \$6 per ton for rock in place.

Date of commencement: October 1, 1904.

Date of completion: December 6, 1904.

*Contract dated February 21, 1905, for dredging about 64,958 cubic yards of material from Stockton channel, California, at 14 $\frac{3}{4}$  cents per cubic yard.*

Name of contractor: North American Dredging Company.

Date of approval: Emergency contract.

Date of commencement: February 28, 1905.

Date of completion: May 16, 1905.

*Contract dated February 21, 1905, for dredging 89,927 cubic yards of material from Stockton channel, California.*

Name of contractor: Marshall C. Harris.

Rate: 14 cents per cubic yard.

Date of approval: Emergency contract.

Date of commencement: February 28, 1905.

Date of completion: May 16, 1905.

## COMMERCIAL STATISTICS.

The following is a statement of the freight and passengers carried on the San Joaquin River during the year 1904 by the boats of the Union Transportation Company, which run regularly between San Francisco and Stockton, and of the California

Navigation and Improvement Company, which run regularly between San Francisco and Stockton and make occasional trips during the high-water season into the upper San Joaquin River:

General freight:	TONS.
Lower San Joaquin River.....	344, 019
Upper San Joaquin River.....	16, 467

Passengers, 74,974.  
A number of scow schooners also carry freight on the lower San Joaquin River, but it has been impossible to obtain any statement of the amount.

T T 7.

IMPROVEMENT OF STOCKTON AND MORMON CHANNELS, CALIFORNIA.

The river and harbor act of June 13, 1902, provided for improvement of this locality by a dam and canal to divert the waters of Mormon Slough into the Calaveras River, based on a project estimated to cost \$255,016, printed in the Annual Report of the Chief of Engineers for 1899, page 3189. The act referred to appropriated \$50,000 and authorized contracts to a limit of \$225,000 for the completion of the work. An aggregate of \$224,316 has now been appropriated by Congress for the work. Among the provisions in the act of 1902 was one that "the city of Stockton or the State of California shall first furnish to the United States the right of way for said canal." The legislature of the State of California appropriated \$60,000 for acquiring this right of way, and the State commissioner of public works is now endeavoring to obtain the necessary property. No work on the project has yet been done. Some of the land has been acquired by the State of California by condemnation.

*Money statement.*

July 1, 1904, balance unexpended .....	\$175, 000. 00
Amount appropriated by sundry civil act approved March 3, 1905 .....	49, 316. 00
July 1, 1905, balance unexpended .....	224, 316. 00

APPROPRIATIONS.

June 13, 1902 .....	\$50, 000
March 3, 1903 .....	50, 000
April 28, 1904 .....	75, 000
March 3, 1905 .....	49, 316
Total .....	224, 316

T T 8.

IMPROVEMENT OF MOKELUMNE RIVER, CALIFORNIA.

This is a tidal stream, one of the tributaries of the San Joaquin River. About 4 miles above the mouth of the Mokelumne it separates into two branches or forks, surrounding Staten Island, which has a length of about 9 miles and an average width of a little less than 2

miles. At the head of this island the two branches reunite, at which place there is a warehouse and steamboat landing called New Hope Landing. About 5 miles above this landing there was up to a year ago a highway bridge without a drawspan across the river, which effectually barred any navigation above that point. This bridge was built jointly by the counties of San Joaquin and Sacramento, and without permission from the Secretary of War. About a year ago, after complaint had been made that this structure, known as the Benson's Ferry bridge, was an unreasonable obstruction to navigation, the two counties owning it ordered its sale and removal. This was accomplished, the bridge being removed. Thereupon the State of California, which had allotted \$10,000, made contracts for and removed snags from the river in the vicinity and above the bridge.

With the assistance of landowners in that section of country, who said they spent \$40,000 additional, all snags were removed from the river for fully 2 miles above the former Benson's Ferry bridge overhanging trees were cut down, sharp bends in the river were either cut away or cut through, levees were built on the south side of the river bank, and the result is that the Mokelumne River is now navigable with a least depth of 2 feet at low water, and reasonably free from snags as far up as the Galt-New Hope bridge, a distance of 20 miles above its mouth, via the north fork of the river, and there is besides an additional length of 14 miles of good navigable river in the south branch or fork of the river.

From the mouth of the Mokelumne up to Snodgrass Slough, a length of about 13 miles, there is a least channel depth of 6 feet. In the next mile above there is a marked shoaling to just below, and at New Hope Landing, where the depth is only about 2 feet at low water, and where there is a tidal range varying from 2 to 4 feet. Around the head of Staten Island, where the two branches or forks reunite, there is also shoaling for half a mile or less in length where the channel depths are only about 2 feet at low tide. From New Hope Landing up river for the next 7 miles, to the present head of navigation, it is reported that there is a least low-water channel depth of 3 feet.

In the past year the State of California and the people living on the river have shown a very decided interest by expending at least \$50,000 in improving this river for 7 miles of its length and extending its navigation 2 miles farther up stream than was previously practicable.

The total amount of money appropriated by Congress for this river up to the present time has been only \$20,500. No work at Government expense has been done on the stream since 1896. Up to the present time none has been required.

The shoals formed and forming in the vicinity of New Hope Landing are serious and detrimental to the interests of navigation. If dredged through, it is believed that the depths would not be long maintained. It is probable that regulating works of some character will have to be placed in the river at or near New Hope Landing to concentrate tidal and freshet discharges in one or the other forks of this river. No plan or project for this purpose has as yet been considered. All treatment of the river heretofore since the first appropriation in 1884 has been by snagging, cutting down overhanging trees, shutting off a little slough, and by dredging at one locality opposite New Hope Landing.

No examination with a view to the permanent improvement of this river has recently been authorized or made. In view of the fact that so much has in the past year been done by the State of California and by the landowners, it is recommended that an examination to determine whether or not the river is worthy of further improvement be authorized.

The commerce of the river is carried on one steamboat, which runs up as far as New Hope Landing. Occasionally small scow schooners go up a few miles farther. The tonnage is variable and depends upon the crops. The lands along the banks are very fertile, but subject to overflow. Last year, on account of a bad break in the Sacramento River, the floods of the Sacramento came through the break into the Mokelumme, caused the breaking of levees on the islands bordering on the Mokelumne, and did millions of dollars' worth of damage. Some of these large islands are not yet unwatered, and in consequence the commerce of the river is much less than in previous years.

*Money statement.*

July 1, 1904, balance unexpended .....	\$364. 24
Amount appropriated by river and harbor act approved March 3, 1905..	2, 500. 00
<hr/>	
July 1, 1905, balance unexpended .....	2, 864. 24
<hr/>	
Amount (estimated) required for completion of existing project ....	Indeterminate.
<hr/>	
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	
2, 500. 00	

APPROPRIATIONS.

July 5, 1884.....	\$8, 500	August 18, 1894.....	\$2, 500
August 5, 1886 .....	2, 500	March 3, 1905 .....	2, 500
August 11, 1888 .....	2, 000	<hr/>	
July 13, 1892.....	2, 500	Total .....	20, 500

COMMERCIAL STATISTICS.

The commerce of the river is carried on one steamboat which runs up as far as New Hope Landing. The amount of freight reported for 1904 was 44,660 tons. Scow schooners go a few miles farther up the river, but it was impossible to obtain a statement of the amount of freight carried by them during the fiscal year.

*Comparative statement of grain and general freight.*

	TONS.		TONS.
1885 .....	42, 000	1901 .....	81, 701
1892 .....	44, 241	1902 .....	43, 299
1893 .....	47, 000	1903 .....	41, 411
1898 .....	52, 771	1904 .....	44, 660
1900 .....	86, 989		

## T T 9.

## IMPROVEMENT OF SACRAMENTO AND FEATHER RIVERS, CALIFORNIA.

## REPORT OF BOARD OF ENGINEERS.

During the month of June of the fiscal year ending June 30, 1905, the Board of Engineers provided for by act of Congress of June 3, 1896, made an examination of the Sacramento River from Red Bluff, the head of navigation, to its mouth; also of the Feather River from Marysville, the head of navigation, in a skiff to Nicolaus; thence to the mouth of the river in a small gasoline stern-wheel boat. At the time of these examinations the Sacramento River was about 1 foot above its low-water stage at Red Bluff and about 9 feet above the same stage at Sacramento. The Feather River during its examination was 12 inches to 18 inches above its ordinary low-water stage.

The Sacramento River, throughout its navigable portion, with the exception of a few nests of visible snags, seemed to be in good navigable condition. The upper portion of the river, between Colusa and Red Bluff (109 miles), is rapid and shoal, and navigation at low stages depends entirely upon the removal of snags and improvement of channel depths by temporary wing dams for purposes of current concentration. In the past year 24 inches channel depth was maintained between Colusa and Red Bluff, and the snag boat did excellent work in snag removal. Between Colusa and the mouth of the river very few snags were visible, and the depths were ample for all the navigation and commerce on the river.

On the Feather River there is practically no commerce between Nicolaus and Marysville, a distance of about 20 miles. Several steamboats have in the past year, at moderately high stages of river, reached Marysville, and in June, 1905, a dredge boat drawing 4 feet 10 inches was towed up river to Yuba City, opposite Marysville, by the steamer *Wright*. There was no trouble due to shoal water anywhere on the trip. At the mouth of the Yuba River, just below Marysville, the swift current and lack of power in the towboat necessitated warping by lines. Even at low water there is sufficient depth in the Feather River for very light-draft steamboats to navigate, but the small amount of commerce and low freight rates would probably make navigation commercially unprofitable for boats. In the lower part of the river, between Nicolaus and its mouth (about 10 miles) a stern-wheel gasoline boat, the *Gretta A*, runs regularly, making two round trips per week. The river is in good navigable condition except at the mouth, where there are some very shoal channels and numerous sand bars. Both shoals and channels are variable in location from season to season.

No Government work has been done on this river for many years, principally because there is so little commerce on the river. The report of a board of engineers submitted in 1898, printed in the Annual Report of the Chief of Engineers for 1899, page 3172, contains the following language:

The present board agrees generally with the view expressed by former ones that if a complete levee system were carried out on the Feather River it would aid in developing the maximum improvement of which it is capable, but they do not consider that the construction of such a system at the present time is either necessary or desirable. The effect of the greatly-increased discharge would be to enlarge the

channel, and granting that the levees could be held, great caving of the banks and erosion of the bottom would certainly ensue. If the banks were revetted and held, the bed of the stream would be lowered and in time some amelioration in low-water depths might result, but meanwhile millions of cubic yards of sand would be forced out into the Sacramento, which is incapable of taking care of it. Considering the relative importance of the two streams, it is far better that this deposit should remain in the Feather River.

\* \* \* \* \*

The Board is satisfied that no permanent improvement at reasonable or justifiable cost can be carried out on the Feather River until the flow of sand and other mining detritus from the Yuba and Bear rivers is stopped. When this shall have been accomplished, the proposition may become a feasible one, though in view of the great cost inevitable and the small commercial interest involved it is open to question whether it would be justifiable.

On the Sacramento River in the past year the snag boat *Seizer* was placed in commission on July 21, 1904, and worked continuously at snagging between Sacramento and Red Bluff until November 28, 1904, during which time 1,176 snags and trees were removed, requiring 424 blasts, using 2,293 pounds of giant powder No. 1; 967 trees were cut from the banks of the river. One wing dam on the right bank of the river, a few hundred feet above the bridge at Sacramento, was repaired by driving 42 piles and adding 100 cubic yards of brush fascines, at a cost of about \$400. In doing the above work 959 miles of river were traveled by the snag boat.

On June 12, 1905, the snag boat *Seizer* again started out on the Sacramento River for the present season's work. On June 30, 1905, she had reached Jacinto Chute, 130 miles above Sacramento, and had removed 248 snags, requiring 58 blasts, using 432 pounds of powder.

At the recent session of Congress, by act of March 3, 1905, it was provided:

Improving Sacramento and Feather rivers, California: The Secretary of War may expend the balance remaining to the credit of the Sacramento and Feather rivers, California, and the Sacramento River below Sacramento, California, for the improvement and maintenance of both of said rivers, including snagging, and for such projects as have been heretofore adopted in the Feather River and in the Sacramento River, both above and below Sacramento, and for the purposes of said improvement and maintenance the Secretary of War may, in his discretion, buy or construct from the amount herein made available another snag boat.

So far as buying or constructing another snag boat from the funds thus made available, this is at present deemed injudicious. Frequently funds appropriated or allotted are insufficient to operate and maintain one snag boat. If a regular, permanent annual appropriation of \$25,000 were made available for snagging, as has been repeatedly recommended by all officers and boards of engineers on this river, then a scow snag boat, not self-propelling, could, and should, be constructed to float downstream and aid the present snag boat in removing snags. The running expenses would be very light, not exceeding \$1,000 per month. The cost of construction would not exceed \$8,000. Such boat alone, however, could not do all the work of snagging required.

The removal of snags is the most important work required for maintenance of navigation on the Sacramento River. Without this character of work, steamboats above Colusa could not run.

By far the larger portion of the freight handled on the Sacramento River originates at or is distributed between Colusa and Red Bluff. It is therefore very important and urgent that an annual appropriation of \$25,000 be made for snagging on this river; and for this purpose



the Board renews its recommendation of last year that special legislation be asked for the purpose of securing uninterrupted work of operating snag boats on the Sacramento and Feather rivers for removing snags, wrecks, and other obstructions, and authorizing the Secretary of War, upon the application of the Chief of Engineers, to draw a warrant from time to time upon the Secretary of the Treasury for such funds as may be necessary to do such work, not to exceed \$25,000 per year, and that an itemized statement of said expenses accompany the Annual Report of the Chief of Engineers.

The only work required at present on this river is snagging, build temporary wing dams in the upper river, and perhaps repairing wing dams in the lower river by adding brush or driving a few piles in case shoaling should occur.

*Money statements.*

SACRAMENTO AND FEATHER RIVERS, CALIFORNIA.

July 1, 1904, balance unexpended .....	\$22,008.56
June 30, 1905, amount expended during fiscal year, for works of improvement .....	15,907.05
July 1, 1905, balance unexpended .....	6,101.51
Amount (estimated) required for completion of existing project ....	Indeterminate.
<div> <div> Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905..... </div> <div> 25,000.00 </div> </div>	
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

SACRAMENTO RIVER, CALIFORNIA.

July 1, 1904, balance unexpended .....	\$52,890.74
July 1, 1905, balance unexpended .....	52,890.74
Amount (estimated) required for completion of existing project ....	Indeterminate.

APPROPRIATIONS.

*Sacramento and Feather rivers, California.*

March 3, 1875.....	\$15,000.00
June 18, 1878.....	15,000.00
March 3, 1879.....	20,000.00
June 14, 1880.....	45,000.00
March 3, 1881.....	60,000.00
August 2, 1882.....	250,000.00
July 5, 1884.....	40,000.00
August 11, 1888.....	20,000.00
September 19, 1890.....	30,000.00
July 13, 1892.....	150,000.00
August 18, 1894.....	115,000.00
June 13, 1902.....	25,000.00
Allotted from act of April 28, 1904.....	22,000.00
Received from sales.....	73.80
	<u>\$807,073.80</u>

*Sacramento River, California.*

March 3, 1899.....	\$30,000.00
June 6, 1900.....	60,000.00
	<u>90,000.00</u>
Total .....	897,073.80



## COMMERCIAL STATISTICS.

Lower Sacramento River, below Sacramento:	Tons.
By the boats of the Sacramento Transportation Company .....	97, 579
By the boats of the Southern Pacific Company .....	127, 185
By the boats of the California Transportation Company .....	47, 158
Upper Sacramento River, above Sacramento:	
From San Francisco and Sacramento to upriver points—	
Lumber .....	12, 608
General merchandise .....	11, 408
From upriver points to San Francisco—	
Hay .....	782
Broom corn .....	401
Wool .....	362
Dried fruit .....	319
Miscellaneous .....	2, 903
From upriver points to Sacramento—	
Wood .....	1, 930
Corn .....	835
Potatoes .....	2, 301
Grain .....	2, 080
Hogs and cattle .....	1, 308
Miscellaneous .....	820
Grain shipments from upriver points to San Francisco and Port Costa:	
From Knights Landing to and including Colusa .....	25, 822
From above Colusa to and including Butte City .....	6, 882
From Butte City to and including Jacinto .....	5, 175
From above Jacinto to and including Chico Landing .....	4, 520
From above Chico Landing to and including Red Bluff .....	786
Total tonnage of the Sacramento River for 1904 .....	353, 164

## T T 10.

## IMPROVEMENT OF PETALUMA CREEK AND NAPA RIVER, CALIFORNIA.

## (A) PETALUMA CREEK.

A description of this creek, its original condition, project for improvement, and work done is printed in the Annual Report of the Chief of Engineers for 1896, page 3205.

During the fiscal year just ended 31,250 cubic yards of material were dredged from the channel between points 800 feet above McNear's canal and 4,800 feet below Haystack Landing, producing a channel 7,200 feet in length, 50 feet in width, and 4 feet deep at low tide. The contract price was 8 cents per cubic yard place measurement. The total cost of the work was \$2,500.

Dredging has to be done here occasionally, about every two years, to maintain navigation. For the year ending June 30, 1907, it is estimated that \$3,000 for this work can be advantageously expended.

*Money statement.*

July 1, 1904, balance unexpended .....	\$3, 173. 33
Amount appropriated by river and harbor act approved March 3, 1905..	2, 000. 00
	<hr/>
	5, 173. 33
June 30, 1905, amount expended during fiscal year, for works of improve- ment .....	2, 928. 10
	<hr/>
July 1, 1905, balance unexpended .....	2, 245. 23
	<hr/>

Amount (estimated) required for completion of existing project.... Indeterminate.

{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 ..... Submitted in compliance with requirements of sundry civil act of June 4, 1897.	\$3,000.00
--	------------

#### APPROPRIATIONS.

June 14, 1880.....	\$8,000	August 18, 1894.....	\$15,000
March 3, 1881.....	8,000	March 3, 1899.....	4,000
August 2, 1882.....	14,000	June 13, 1902.....	3,000
August 11, 1888.....	2,000	March 3, 1905.....	2,000
September 19, 1890.....	4,000		
July 13, 1892.....	10,000	Total.....	70,000

#### COMMERCIAL STATISTICS.

The commerce of Petaluma Creek, which is important and increasing, is now carried on two steamers—the *Gold*, 334 tons, and the *Leader*, 400 tons—which make daily trips between San Francisco and Petaluma, the head of navigation. A large amount of the heavier freight is also carried on scow schooners, several of which make daily trips into the creek, but no statement that is anything but a wild guess can be obtained of the amount of freight they carry.

The managers of the steamers report that they carried 44,000 tons of freight during the year 1904.

#### (B) NAPA RIVER.

A description of this river, its condition, plans for improvement, and results obtained are printed in the Annual Report of the Chief of Engineers for 1896, page 3177.

Preliminary examination of the river was made in August, 1902, and report is printed in the Annual Report for 1904, page 3427.

In the past fiscal year, in August and September of 1904, several of the worst bars below Tannery wharf were dredged out to a depth of 4 feet below low-water level and channels obtained 75 feet wide. The work was done by contract, at 20 cents per cubic yard place measurement, consisted of 14,200 cubic yards, and cost \$2,840, which practically exhausted the balance available.

Thereafter an allotment of \$4,500 was made from the emergency river and harbor act of 1904 for further dredging up to the town of Napa. Bids were opened on December 4, 1904. The only bid received was for 20 cents per cubic yard, and being deemed too high was rejected. Bids were again asked for, and opened on March 11, 1905, and contract for dredging 19,500 cubic yards was made with the Bay and River Dredging Company at 14½ cents per cubic yard. Contract was made on above basis on March 27, 1905. Work was commenced on May 25, 1905, and is still in progress. It will probably be completed in July, 1905. Up to June 30, 1905, 13,482 cubic yards had been dredged, which furnished a channel 3,750 feet in length, 75 feet wide, and 4 feet in depth at low tide. Steamboats now run regularly to Napa, but rely principally on tides, which have a range of about 5 feet.

During the year ending June 30, 1907, \$3,000 can be advantageously expended on this river.

*Money statement.*

July 1, 1904, balance unexpended .....	\$3,393. 63
Amount appropriated by river and harbor act approved March 3, 1905.	1,000. 00
Amount allotted from appropriation for maintenance of river and harbor improvements, act of April 28, 1904.....	4,500. 00
	<hr/>
	8,793. 63
June 30, 1905, amount expended during fiscal year, for works of improvement .....	3,735. 76
	<hr/>
July 1, 1905, balance unexpended .....	5,057. 87
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	2,576. 25
	<hr/>
Amount (estimated) required for completion of existing project....	Indeterminate.
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	3,000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

## APPROPRIATIONS.

August 12, 1888 .....	\$7,500	Allotted from emergency river	
September 19, 1890 .....	10,000	and harbor act of April 28, 1904.	\$4,500
August 18, 1894 .....	4,000	March 3, 1905.....	1,000
June 3, 1896.....	4,000		<hr/>
June 13, 1902.....	3,000	Total .....	34,000

## CONTRACTS IN FORCE.

*Contract dated May 31, 1904, for dredging about 35,000 cubic yards of material from Petaluma Creek and 38,824 cubic yards of material from Napa River, California.*

Rate: 8 cents per cubic yard in Petaluma Creek and 20 cents per cubic yard in Napa River.

Name of contractor: Pacific Reclamation Company.

Date of approval: June 15, 1904.

Date of commencement: July 10, 1904.

Date of completion: September 9, 1904.

*Emergency contract dated March 27, 1905, for dredging about 20,000 cubic yards of material from Napa River, California.*

Rate: 14½ cents per cubic yard.

Name of contractor: Bay and River Dredging Company.

Work commenced: May 25, 1905.

Work completed: Still in progress, will probably be completed by July 25, 1905.

## COMMERCIAL STATISTICS.

The commerce of the Napa River is carried on two small steamers, the *St. Helena*, 344 tons, and the *Zinfandel*, 329 tons, which make trips between San Francisco and Napa, the head of navigation, on alternate days, thus providing a daily service. The amount of freight carried by these boats during the year 1904 is believed to have been about 80,000 tons, but a statement of it, which was promised, has not been received in time to be included in this report. Much heavy freight is carried by scow schooners which make regular trips into this stream, but no statement of the amount can be obtained.

T T II.

IMPROVEMENT OF HUMBOLDT HARBOR AND BAY, CALIFORNIA.

The history of this work is printed in the Annual Report of the Chief of Engineers for 1900, page 4237.

All work contemplated and authorized for the improvement of the entrance, as well as inside the bay, has been completed. Preliminary examination, with a view to deepening the channel in front of Eureka, was authorized in the river and harbor act of March 3, 1905. Examination has been made; survey is required and has been authorized to make an estimate to determine cost of improvement.

A shoal has formed outside the entrance to the jetties. A survey of the entrance to determine what changes have occurred in the past two years will be made in July and August, 1905. No work has been done in the past year. No further funds are required at present.

Money statement.

July 1, 1904, balance unexpended .....	\$10,473.70
June 30, 1905, amount expended during fiscal year, for works of improvement .....	240.00
<hr/>	
July 1, 1905, balance unexpended .....	10,233.70

APPROPRIATIONS.

March 2, 1881 .....	\$40,000	March 2, 1895 .....	\$225,000
August 2, 1882 .....	40,000	June 11, 1896 .....	225,000
July 5, 1884 .....	62,500	June 4, 1897 .....	350,000
August 5, 1886 .....	75,000	July 1, 1898 .....	100,000
August 11, 1888 .....	125,000	March 3, 1899 .....	50,000
September 19, 1890 .....	80,000	March 3, 1899 .....	143,115
July 13, 1892 .....	150,000	<hr/>	
March 3, 1893 .....	522,000	Total .....	2,187,615

COMMERCIAL STATISTICS.

The following statement of the commerce of Humboldt Bay, California, for the year 1904, was collected and supplied by Mr. George A. Kellogg, secretary of the Humboldt Chamber of Commerce, at Eureka, Cal.:

Articles.	Tons.	Value.
EXPORTS.		
Lumber.....	412,033	\$4,776,920
Produce.....	11,279	1,735,940
Miscellaneous .....	8,180	515,560
Total.....	431,492	7,028,420

Articles.	Tons.	Value.
IMPORTS.		
General merchandise .....	78,960	\$3,948,000
Iron .....	6,500	227,500
Coal .....	1,250	8,750
Hay .....	3,670	44,040
Wool, scoured .....	112	78,750
Miscellaneous .....	7,081	415,587
Total .....	97,873	4,722,577

•                      *Movement of vessels, tonnage, and passengers.*

	Steam vessels.	Sail vessels.	Total vessels.	Ton- nage.	Passen- gers.
Arrived .....	702	180	882	395,200	15,845
Departed .....	701	184	885	396,625	14,908
Total .....	1,403	264	1,667	791,825	30,753

## APPENDIX U U.

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### IMPROVEMENT OF RIVERS AND HARBORS IN WESTERN OREGON, OF COLUMBIA RIVER ABOVE THE MOUTH OF WILLAMETTE RIVER, AND OF SNAKE RIVER, OREGON, WASHINGTON, AND IDAHO.

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#### REPORT OF MAJ. W. C. LANGFITT, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905, WITH OTHER DOCUMENTS RELATING TO THE WORKS.

##### IMPROVEMENTS.

- |   |   |
|---|---|
| 1. Coquille River, Oregon, between Coquille and Myrtle Point.                         | 10. Columbia River between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington. |
| 2. Entrance to Coos Bay and Harbor, Oregon.   | 11. Canal at the Cascades, Columbia River, Oregon.  |
| 3. Harbor at Coos Bay, Oregon (dredging).   | 12. Operating and care of canal and locks at the Cascades of the Columbia River, Oregon.                      |
| 4. Coos River, Oregon.  | 13. Columbia River between Vancouver, Washington, and mouth of Willamette River.                              |
| 5. Mouth of Siuslaw River, Oregon.  |   |
| 6. Yaquina Bay, Oregon.   |   |
| 7. Tillamook Bay and bar, Oregon.   |   |
| 8. Dredging plant for use at harbor on coast of Oregon below mouth of Columbia River. |   |
| 9. Upper Columbia and Snake rivers, Oregon and Washington.                            |   |
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ENGINEER OFFICE, UNITED STATES ARMY,  
*Portland, Oreg., July 14, 1905.*

GENERAL: I have the honor to transmit herewith annual report  
\* \* \* for the fiscal year ending June 30, 1905, for works of river  
and harbor improvement in my temporary charge.

Very respectfully, your obedient servant,

W. C. LANGFITT,  
*Major, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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## U U I.

### IMPROVEMENT OF COQUILLE RIVER, OREGON, FROM COQUILLE CITY TO MOUTH.

Information concerning the project for the construction of jetties at the mouth of the Coquille River is given in the summary of this report.

## OPERATIONS DURING THE FISCAL YEAR 1905.

No active work of jetty construction was in progress during the year, the only work done being in connection with repairs to and maintenance of plant and making a survey of the bar. A survey boat was constructed and part payment made therefor from available funds.

The last work done on the jetty was in October, 1903, when a contract was completed for extending the north jetty a distance of 555 feet. The river and harbor act of March 3, 1905, appropriated \$55,000 for continuing the work, and this amount, it is believed, will be sufficient for extending the north jetty to its projected length.

Preparatory to resuming active operations, it was decided to improve the very much dilapidated plant used in former years by adding to it some of the plant from the work at the Siuslaw River, which work has been abandoned. This was accordingly done, and during May and June the work of repairing the scows and putting the plant in serviceable condition was commenced.

A survey of the entrance to the Coquille River was also completed during June. The survey shows that the bar channel has a depth of about 8 feet at mean lower low water. A map of this survey is transmitted herewith.

There is also a shoal just above the Government wharf, near Bandon, and two other similar shoals—one above Randolph and one near Parkersburg—each with a depth of about 5 feet at low water. These shoals caused more trouble to vessels than the ocean bar.

The submerged rock in the harbor throat, which is about 180 feet north of the south jetty, should be removed, for further details of which see Annual Report of the Chief of Engineers for 1903, page 2207.

The enrockment at the completed south jetty has suffered no material deterioration during the year. About 15 bents of the tramway were carried away from the outer end of the north jetty, but only a slight subsidence of the enrockment has taken place. Some of the approach to this tramway was also undermined and washed away during the year.

With the funds now available, it is proposed to extend the north jetty a distance of approximately 515 feet, and specifications were issued under date of May 22, and opened on June 22, 1905. The most advantageous bid received was that of Mr. John Kiernan, of Portland, Oreg., inasmuch as he specified delivery of rock from Tupper Rock quarry, which is known to furnish the best rock in the vicinity. It was accordingly recommended that his bid be accepted and should the contract be made it is expected that the proposed work at the mouth of the Coquille River will be completed sometime during the coming winter or spring.

*Money statement.*

July 1, 1904, balance unexpended .....	\$2, 454. 15
Amount appropriated by river and harbor act approved March 3, 1905..	55, 000. 00
	<hr/>
	57, 454. 15
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	2, 451. 36
	<hr/>
July 1, 1905, balance unexpended .....	55, 002. 79
July 1, 1905, outstanding liabilities .....	2, 400. 00
	<hr/>
July 1, 1905, balance available .....	52, 602. 79



# Entrance TO THE **COQUILLE RIVER,** OREGON.

Surveyed under direction of  
Major W. C. LANGFITT, Corps of Eng<sup>s</sup> U.S.A.  
MAY, 1905

Scale



U.S. Engineer Office  
Portland, OREGON.

To accompany Annual Report for  
the Fiscal year ending June 30, 1905

*W. C. Langfitt*  
Major, Corps of Engineers  
U.S. Army.

PACIFIC

Barn  
Keepers House  
L.N. Flag Pole

HOUSE RESERVE

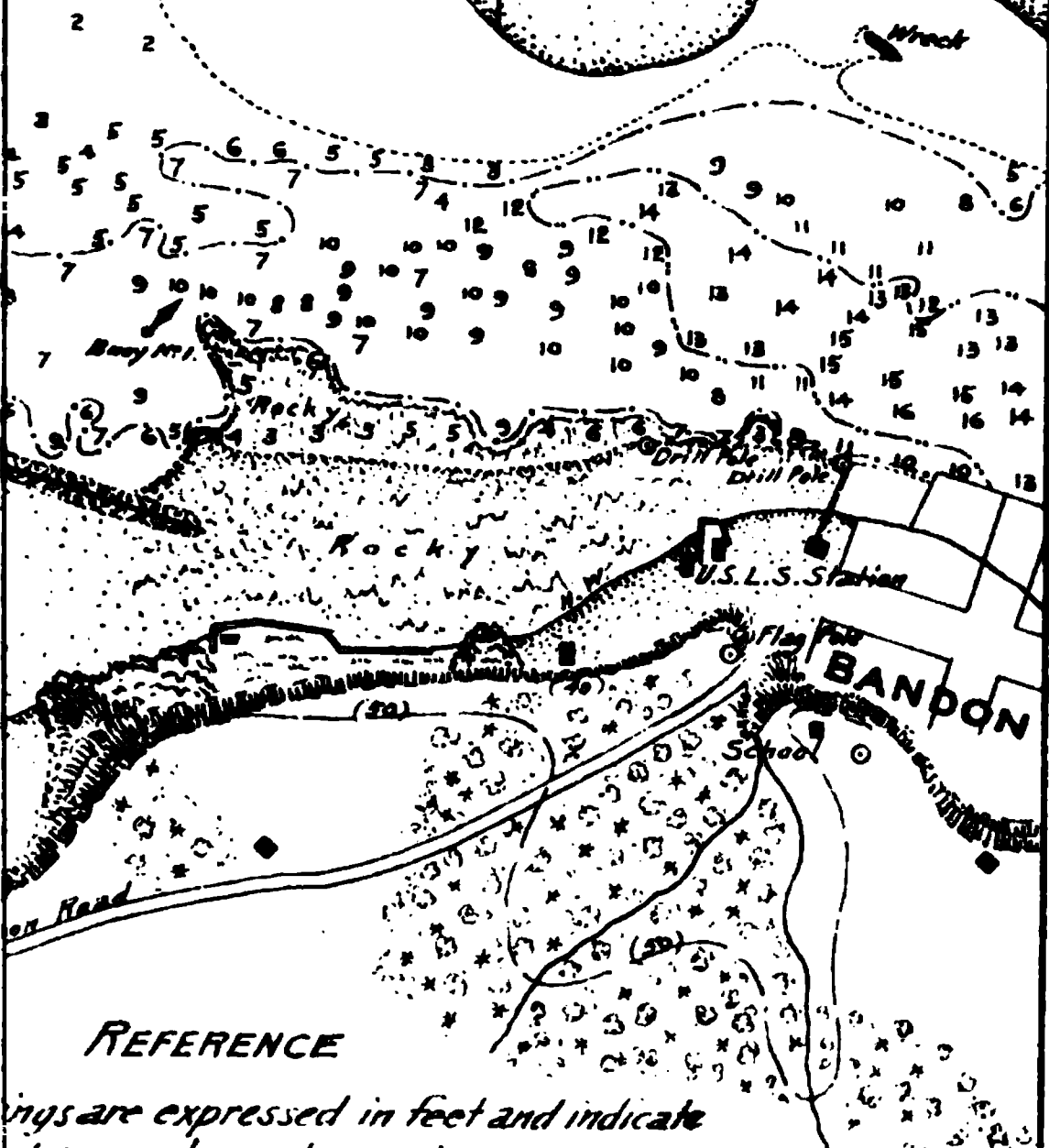
30 29 28

High Water line

Low Water line

Old Tramway

Wreck



## REFERENCE

ings are expressed in feet and indicate  
at mean lower low water.

range of Tide 4.2 feet.

6 feet depth shown thus

12	"	"	"	"	-----
18	"	"	"	"	-----
24	"	"	"	"	-----

A.D.

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APPROPRIATIONS.

June 14, 1880.....	\$10, 000	August 18, 1894.....	\$20, 000
August 2, 1882.....	10, 000	June 3, 1896.....	20, 000
July 5, 1884.....	10, 000	March 3, 1899.....	40, 000
August 5, 1886.....	20, 000	June 13, 1902.....	30, 000
August 11, 1888.....	25, 000	March 3, 1905.....	55, 000
September 19, 1891.....	30, 000		
July 13, 1892.....	25, 000	Total .....	295, 000

COMMERCIAL STATISTICS.

The following commerce was carried by vessels across the bar at the mouth of the Coquille River during the calendar year 1904:

Articles.	Inbound.	Outbound.	Articles.	Inbound.	Outbound.
	Tons.	Tons.		Tons.	Tons.
Broom handles.....		519	Match wood.....		3, 865
Cord wood.....		55	Miscellaneous.....	4, 942	1, 205
Coal.....		854	Vegetables.....		15
Fish.....		225	Shingles.....		101
Lumber.....		48, 459			
Livestock.....		64	Total.....	4, 942	55, 962
Machinery.....	40	600			

Number of passengers arrived by sea, 369; departed by sea, 375.

List of vessels crossing bar at entrance of Coquille River, Oregon, during year ending December 31, 1904.

Name.	Character.	Length.	Breadth.	Depth of hold.	Draft when fully laden.	Net tonnage.	Times arrived.	Times departed.	Times arrived and departed.
		Feet.	Feet.	Feet.	Feet.				
Advance.....	Sail.....	139. 8	34. 4	9. 4	11. 5	265	8	9	17
Alpha.....	do.....	143. 8	34. 9	9. 5	12. 0	274	3	4	7
Antelope.....	do.....	89. 5	28. 5	7. 0	9. 0	117	1	1	2
Bella.....	do.....	121. 0	32. 0	6. 0	10. 5	147	1	2	3
Berwick.....	do.....	82. 6	27. 4	7. 1	9. 0	95	2	3	5
C. A. Klose.....	do.....	145. 0	36. 5	9. 0	.....	370	2	2	4
Chico.....	Steam.....	146. 6	28. 8	18. 0	12. 0	396	16	16	32
Coquille.....	Sail.....	92. 9	29. 5	6. 4	8. 5	97	6	7	13
Elizabeth.....	Steam.....	142. 0	35. 8	9. 9	12. 0	234	31	31	62
Hugh Hogan.....	Sail.....	160. 0	38. 8	9. 8	12. 0	355	1	.....	1
Lizzie Prien.....	do.....	94. 8	30. 6	6. 4	8. 0	91	5	4	9
Onward.....	do.....	134. 1	35. 4	10. 0	12. 0	255	6	7	13
Rio Rey.....	Steam.....	79. 0	25. 2	6. 0	8. 0	60	1	1	2
Ruby.....	Sail.....	132. 0	34. 0	9. 0	10. 5	306	5	6	11
Sacramento.....	do.....	100. 7	31. 2	6. 5	9. 0	124	1	1	2
Western Home.....	do.....	96. 5	29. 0	7. 9	12. 0	128	4	4	8
Total.....							93	96	191

U U 2.

IMPROVEMENT OF ENTRANCE TO COOS BAY AND HARBOR, OREGON.

For information concerning the approved project for the improvement of Coos Bay and Harbor, Oregon, attention is invited to the summary of this report.

## OPERATIONS DURING THE FISCAL YEAR 1905.

No active operations were carried on during the fiscal year ending June 30, 1905, except to make repairs to buildings, plant, etc., and in making a resurvey of the bar entrance.

The north jetty tramway is becoming badly decayed and the piles eaten by the teredo, and during the winter some 700 feet of the tramway just beyond the high-water shore line on the north side were washed away.

During April and May the old rails remaining on the tramway, together with all plant, was brought to a place of safety and stored to avoid being carried away by the waves.

A survey of the bar and entrance as far as Pigeon Point was made in the latter part of June, which shows that the bar channel leads straight out to sea on a line parallel with the jetty and is fully 500 feet wide with a least depth at mean lower low tide of 19 feet. Map of survey is transmitted herewith.

In April Guano Rock, a prominent land mark in the entrance near Coos Head which projected at least 10 feet above ordinary high tide, was undermined and broken off by the sea. A small portion of this rock now shows about 2 feet out of the water at low tide.

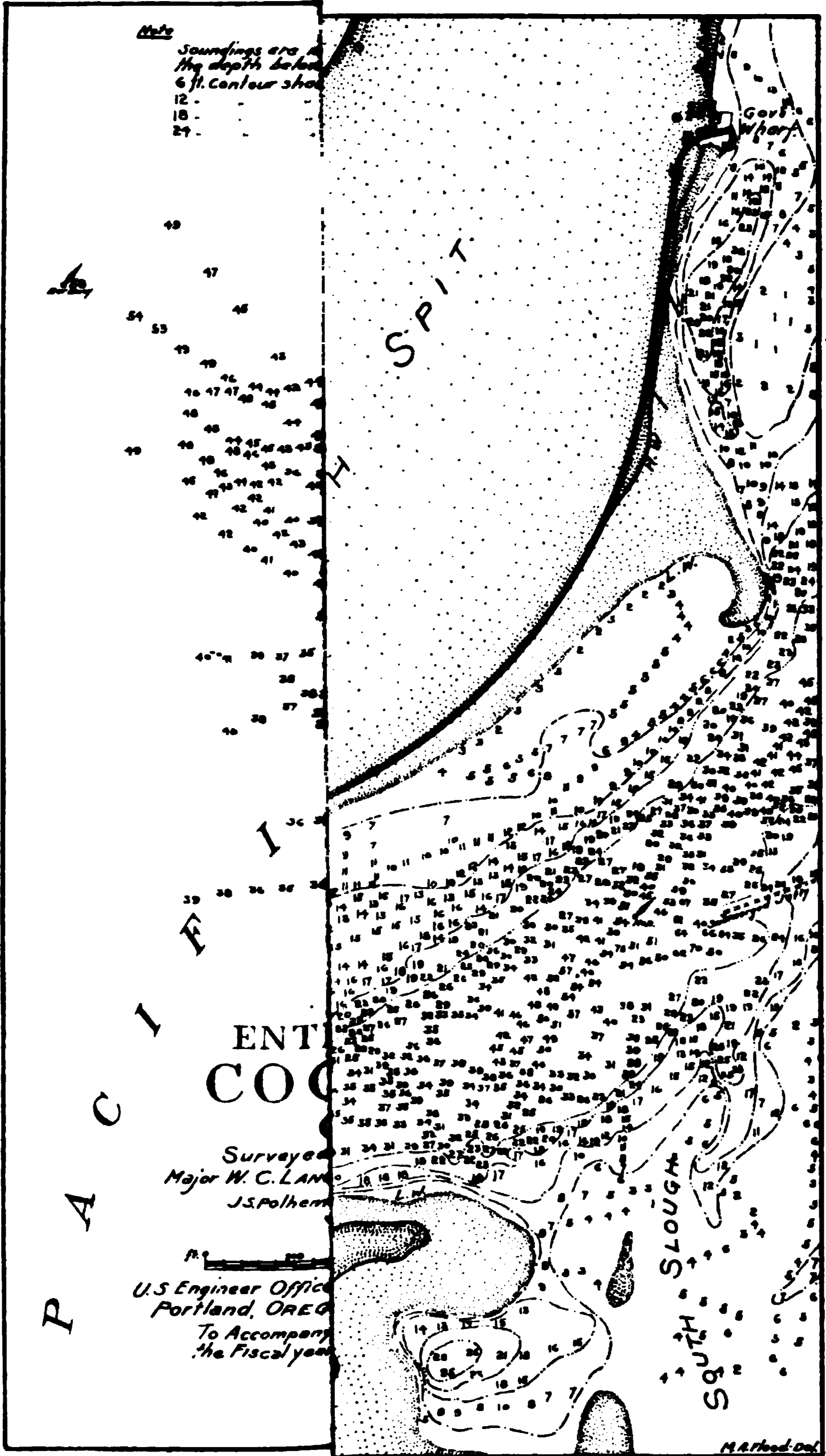
The condition of the north jetty has changed very little since the last report. At trestle bent No. 600 the enrockment is well above high tide; beyond that to the extreme end, which was bent No. 648, the enrockment is mostly below low tide and at the extreme outer end about 15 feet below low tide. At three or four short sections of the jetty between the shore and bent No. 600 the enrockment has been beaten down slightly below the line of low water and to the level of the sands on the north side of the structure, but for the most part the crest of the jetty enrockment is still above half tide.

During the year the small survey steamer *Arago* was constructed under contract and was completed and put in commission in May. The expense of constructing this boat was borne in equitable proportion by the various coast works south of the mouth of the Columbia River and is to be used in survey work, etc., in connection therewith.

The river and harbor act of March 3, 1905, provided for expenditure of so much of the available funds as might be necessary on the improvement of Coos River, and \$3,000 has been allowed for that purpose.

*Money statement.*

July 1, 1904, balance unexpended .....	\$50, 945. 38
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	17, 578. 47
July 1, 1905, balance unexpended .....	33, 366. 91
July 1, 1905, outstanding liabilities .....	1, 023. 00
July 1, 1905, balance available .....	32, 343. 91
Amount (estimated) required for completion of existing project .....	1, 741, 412. 20



THE NORRIS PETERS CO. PHOTO-LITHO. WASHINGTON, D. C.



APPROPRIATIONS.

March 3, 1879 .....	\$40,000.00	June 13, 1902 .....	\$50,000.00
March 3, 1881 .....	30,000.00	Deposited June 13, 1904, ac-	
August 2, 1882 .....	30,000.00	count proceeds Govern-	
July 5, 1884 .....	30,000.00	ment property.....	263.48
August 5, 1886 .....	33,750.00		
August 11, 1888 .....	50,000.00	Total .....	939,014.04
September 19, 1890 .....	125,000.00	April 5, 1905, allotted to Coos	
July 13, 1892 .....	210,000.00	River.....	3,000.00
August 18, 1894 .....	95,000.00		
June 3, 1896 .....	95,000.00	Aggregate.....	936,014.04
March 3, 1899 .....	150,000.00		
November 10, 1900, refund-			
ment of overpayment.....	.56		

CONTRACT IN FORCE.

Formal: Name of contractor—Willamette Iron and Steel Works, Portland, Oreg.  
Date of contract: June 24, 1904.  
Character of work: Constructing and delivering vessel.  
Amount of work: One vessel.  
Price: \$24,490.  
Approved: July 14, 1904.  
Dates of beginning and expiration: Vessel to be completed within one hundred and fifty days from July 20, 1904.  
Extension: Time for completion extended a reasonable period.  
Completed: February 28, 1905.

COMMERCIAL STATISTICS.

The following commerce was carried by vessels across the bar at the entrance to Coos Bay during the calendar year 1904:

Articles.	Inbound. Outbound.		Articles.	Inbound. Outbound.	
	Tons.	Tons.		Tons.	Tons.
Coal .....		60,150	Live stock .....	7	8
Chittim bark .....	12	63	Machinery .....	247	160
Dairy produce .....	14	622	Match wood .....		355
Fruit .....	280	1,016	Miscellaneous.....	17,377	4,924
Fish .....	483	180	Poles.....	3	10
Grain .....	192		Vegetables.....	59	687
Hay .....	63		Woolen goods.....	25	35
Lumber .....	31	49,717	Total.....	18,793	118,165
Logs.....		18			
Laths.....		230			

Number of passengers arrived by sea, 2,864; departed by sea, 2,573.

List of vessels crossing the bar at entrance to Coos Bay, Oregon, during the year ending December 31, 1904.

Name.	Character.	Length.	Breadth.	Depth of hold.	Draft when fully laden.	Net tonnage.	Times arrived.	Times de- parted.	Times arrived and de- parted.
		<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>				
Aberdeen .....	Steam .....	169.8	34.2	11.8	12.0	394	5	5	10
Addenda .....	Sail.....	176.3	39.8	14.0	18.0	637	1	1	2
Advent .....	do .....	151.5	35.0	12.6	17.0	399	6	5	11
Alliance .....	Steam .....	164.4	35.6	12.0	16.0	431	42	42	84
Arcata .....	do .....	180.0	26.2	8.6	15.0	415	35	34	69
Bella.....	Sail.....	121.0	32.0	6.0	10.0	147	1	1	2
Berwick .....	do .....	82.6	27.4	7.1	8.0	95	3	3	6
Breakwater.....	Steam .....	201.0	30.0	19.3	16.0	793	28	27	55



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*List of vessels crossing the bar at entrance to Coos Bay, Oregon, during the year ending December 31, 1904—Continued.*

Name.	Character.	Length.	Breadth.	Depth of hold.	Draft when fully laden.	Net ton- nage.	Times ar- rived.	Times de- parted.	Times arrived and de- parted.
		<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>				
Challenger.....	Sail.....	127.9	32.5	9.2	.....	265	1	1	2
Chas. E. Falk.....	do.....	142.3	34.0	9.0	.....	245	2	2	4
Chehalis.....	do.....	177.5	40.0	14.5	18.0	642	1	1	2
Chico.....	Steam.....	146.6	28.8	18.0	.....	396	4	4	8
Czarina.....	do.....	216.0	30.8	14.1	17.0	798	20	19	39
Empire.....	do.....	170.1	32.7	20.1	17.0	525	17	16	33
Encore.....	Sail.....	181.9	36.4	14.0	.....	572	1	1	2
Esther Buhne.....	do.....	134.6	34.0	9.0	12.0	245	5	5	10
F. A. Kilburn.....	Steam.....	165.5	29.7	20.0	15.0	458	5	5	10
Glen.....	Sail.....	106.6	29.0	8.3	10.0	121	1	1	2
Heather.....	Steam.....	165.0	28.5	14.9	15.0	.....	1	1	2
Homer.....	do.....	146.0	33.8	17.0	.....	331	3	3	6
Hugh Hogan.....	Sail.....	160.0	38.8	9.8	12.0	355	.....	1	1
Hunter.....	Steam.....	95.0	21.7	10.4	13.0	52	24	24	48
Ivy.....	Sail.....	102.5	28.8	8.8	10.0	135	9	10	19
James A. Garfield ..	do.....	140.0	37.5	10.2	.....	300	2	2	4
Jennie Wand.....	do.....	124.0	32.8	9.0	12.0	163	1	2	3
Jessie Minor.....	do.....	129.0	32.5	9.2	.....	219	2	2	4
Lillian.....	Steam.....	57.5	11.2	5.3	5.0	17	.....	1	1
L. Roscoe.....	do.....	85.5	22.0	9.0	10.0	75	9	10	19
Manzanita.....	do.....	152.0	26.0	11.5	10.0	.....	2	2	4
Marshfield.....	do.....	148.0	33.0	10.5	.....	294	1	1	2
Mary E. Russ.....	Sail.....	115.5	32.0	9.6	11.0	223	2	2	4
Melancthon.....	do.....	133.0	30.5	10.9	14.0	283	4	4	8
Mildred.....	do.....	157.0	36.0	12.2	16.0	411	1	1	2
North Bend.....	do.....	153.5	32.8	11.2	.....	357	3	3	6
Novelty.....	do.....	168.2	39.0	13.0	18.0	584	3	3	6
Omega.....	do.....	163.2	39.3	13.5	.....	522	1	1	2
Repeat.....	do.....	148.9	34.4	12.0	.....	410	2	3	5
Robarts.....	Steam.....	75.5	18.2	6.5	8.0	24	2	2	4
San Buenaventura ..	Sail.....	107.0	30.0	8.5	.....	171	1	1	2
Sausalito.....	do.....	142.5	35.5	10.0	.....	326	2	2	4
Sea Rover.....	Steam.....	121.0	24.5	15.0	.....	116	1	1	2
Signal.....	do.....	150.0	34.4	13.8	16.0	392	15	15	30
Tam O'Shanter.....	Sail.....	170.0	38.5	14.0	18.0	562	4	4	8
Toledo.....	Steam.....	107.0	21.0	10.0	11.0	72	7	7	14
Triumph.....	do.....	64.0	19.7	8.0	.....	27	1	1	2
Viking.....	Sail.....	108.0	30.0	8.2	10.0	139	1	1	2
Volunteer.....	do.....	128.4	38.9	12.0	15.0	542	3	3	6
Webfoot.....	do.....	146.5	31.6	10.8	14.0	343	3	4	7
Wenona.....	Steam.....	60.7	16.0	4.8	.....	51	.....	1	1
Western Home.....	Sail.....	96.5	29.0	7.9	.....	128	2	2	4
Wm. Baylies.....	Steam.....	118.5	28.0	16.5	17.0	291	1	1	2
Total.....							291	294	585

U U 3.

IMPROVEMENT OF COOS BAY, OREGON (DREDGING).

The first appropriation for dredging in Coos Bay, in addition to the improvement at the mouth of the river, was made by the act of August 18, 1894, of \$13,000, and a further sum of \$14,390 was appropriated by the act of June 3, 1896.

The status of this improvement, with further details, is given in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1905.

As reported in the annual report on improvement of Coos Bay and Harbor, Oregon, for the fiscal year 1903, a shoal had formed at the mouth of Pony Slough, in Coos Bay, and vessels drawing 9 feet were obliged to lighter their cargoes over the shoal.

On recommendation, an allotment of \$10,000 was made on August 5, 1903, from the emergency act of June 6, 1900, which was expended, and the results accomplished not being sufficient for the needs of navigation, a further allotment of \$3,500 was made on May 17, 1904, for continuation of the work of dredging.

At the beginning of the fiscal year dredging was in progress in Coos Bay at the mouth of Pony Slough, under allotment of \$3,500 made on May 17, 1904, and continued up to August 24, when the funds had been exhausted. The amount of material excavated was 12,190 cubic yards, and the results of the dredging left a cut through the entire shoal about 100 feet wide and not less than 14 feet deep at mean lower low tide. At the close of the fiscal year soundings show that the dredged cut is shoaling in places and is beginning to give trouble to vessels.

In May, 1905, complaint was made that the shoals opposite the town of Marshfield, through which a cut 150 feet wide and 13 feet deep at low water had been dredged in 1898-99, had shoaled to such an extent that delay was caused to commerce using the channel. On recommendation, an allotment of \$5,000 was made from emergency funds, and at the close of the fiscal year a survey is in progress to ascertain the extent of the shoaling and the amount of material to be removed.

On account of the inadequacy of the Government plant, it is proposed to dredge the cut by contract if favorable bids are received.

The maintenance of the required depth of channel from the entrance to the bay up to Marshfield, the head of deep sea navigation, will no doubt require dredging from time to time, necessitating further expenditures. The maintenance of this channel, it is believed, should be made a part of the improvement of Coos Bay and Harbor (general improvement). No amount is therefore named in the money statement to be appropriated.

Should the project for the construction of a dredging plant for the use of the various coast harbors, as recommended in a separate report, be approved, the plant could be used to good advantage in connection with this work.

*Money statement.*

July 1, 1904, balance unexpended .....	\$3, 692. 65
Amount allotted from appropriation for maintenance of river and harbor improvements, act of March 3, 1905.....	5, 000. 00
	<hr/>
	8, 692. 65
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	3, 692. 65
	<hr/>
July 1, 1905, balance unexpended .....	5. 000. 00

APPROPRIATIONS.

August 18, 1894 .....	\$13, 000. 00	June 6, 1900 (allotted).....	\$10, 000. 00
June 3, 1896.....	14, 390. 00	June 13, 1902 (allotted).....	3, 500. 00
February 2, 1900 (refundment of overpayment made by voucher No. 37, January, 1899) .....	9. 75	May 17, 1905 (allotted) .....	5, 000. 00
			<hr/>
		Total .....	45, 899. 75

U U 4.

IMPROVEMENT OF COOS RIVER, OREGON.

The project for obtaining a channel 50 feet wide, free from obstructing bowlders and snags, from the mouth of the river in Coos Bay to the head of tide on the North and South forks, and the result of operations, are mentioned in the Annual Report of the Chief of Engineers for 1900, pages 644-645, 4283-4284.

OPERATIONS DURING THE FISCAL YEAR 1905.

No work has been done on the Coos River during the fiscal year. The last work done was in the spring of 1904, when the snag-scow was operated by hired labor and the stream thoroughly snagged. During the past winter snags have been washed into the river or have been exposed by the currents, and the channel will again require a thorough snagging.

The river and harbor act of March 3, 1905, authorized for this work the expenditure of such amount as might be necessary of the funds now available for improving the entrance to Coos Bay and Harbor, and \$3,000 has accordingly been allotted from the funds mentioned. It is proposed to do the necessary snagging with the Government snag-scow during the coming low-water season.

It is believed that the funds available will be sufficient for all purposes at the present time, but as the winter freshets usually bring into the channel numerous snags and trees, the same conditions will probably exist next year.

It is estimated that with the present plant available the sum of \$3,000 could be profitably expended, and this sum is accordingly named in the money statement, and should be appropriated for the work.

*Money statement.*

July 1, 1904, balance unexpended .....	\$458. 75
Amount allotted by river and harbor act approved March 3, 1905, from appropriation for Coos Bay and Harbor .....	3, 000. 00
July 1, 1905, balance unexpended .....	3, 458. 75
<hr/>	
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905.....	3, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

June 3, 1896 .....	\$5, 000
March 3, 1899.....	3, 000
June 13, 1902.....	2, 000
April 5, 1905, allotted from "Improvement of Coos Bay and Harbor, general improvement" .....	3, 000
Total .....	13, 000

## COMMERCIAL STATISTICS OF COOS RIVER, OREGON.

Articles.	Up freight.	Down freight.	Articles.	Up freight.	Down freight.
	<i>Tons.</i>	<i>Tons.</i>		<i>Tons.</i>	<i>Tons.</i>
Cordwood .....		40	Machinery .....	68	
Coal .....	480		Miscellaneous .....	552	394
Chittim bark .....		42	Piles .....		1,991
Dairy produce .....	1	1,819	Poles .....		60
Eggs .....		35	Spars .....		87
Fruit .....		432	Vegetables .....	23	592
Fish .....	4	111	Woolen goods .....	1	4
Grain .....	202	10			
Hay .....	122	214	Total .....	2,298	47,609
Lumber .....	705	1,575	Up freight .....		2,298
Logs .....		39,910			
Live stock .....	140	343	Total .....		49,907

Number of passengers carried up river..... 9,782

Number of passengers carried down river..... 9,606

Total..... 19,388

The following are the regular steamers plying Coos River:

Name.	Character.	Length.	Breadth.	Depth.	Draft loaded.	Net tonnage.
		<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	
Alert .....	Stern-wheel .....	81	18.0	4.0	3.0	81
Alma .....	Screw .....	50	12.0	3.0	2.0	9
Coos River .....	do .....	44	12.0	5.0	4.0	8
Curlew .....	Gas screw .....	36	7.6	3.5	3.0	8
Rosebud .....	do .....	28	7.8		3.4	
Sumner .....	do .....	30	7.4	4.0	3.0	5
Telephone .....	do .....	36	8.0	3.0	2.0	7

In addition to the above-named there are several gasoline boats and launches in the stream owned and operated by farmers living in the valley. Owing to the formation of the country, transportation other than by water is at present impracticable. The stream is therefore used as a highway for transporting practically all the commerce and passengers of the region.

## U U 5.

## IMPROVEMENT OF SIUSLAW RIVER, OREGON.

For further details of this work, with status of improvement, see summary of this report.

## OPERATIONS DURING THE FISCAL YEAR 1905.

No active operations were carried on during the fiscal year other than those in connection with watching and caring for the Government plant used in construction and in making the transfer of the property to other works.

The expenditures during the fiscal year were in great part due to the construction of a small survey steamer, the expense of which was borne in equitable proportion by the works on the Oregon coast south of the mouth of the Columbia River.

The river and harbor act of March 3, 1905, provided for closing out the work and distributing the property on other works where active operations are in progress or proposed. This was accomplished during June, and at the close of the year the watchman's services had been dispensed with and the property all distributed except that which is unserviceable and which it is intended to bring to Portland for condemnation.



U U 6.

IMPROVEMENT OF YAQUINA BAY, OREGON.

For information relative to the various projects for the improvement of Yaquina Bay, Oregon, attention is invited to the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1905.

No active operations were carried on during the fiscal year other than those in connection with watching and caring for the Government plant used in construction and in making the transfer of the property to other works.

The expenditures during the fiscal year were in a great part due to the construction of a small survey steamer, the expense of which was borne in equitable proportion by the works on the Oregon coast south of the mouth of the Columbia River.

The river and harbor act of March 3, 1905, provided for closing out the work and distributing the property to other works where active operations are in progress or proposed. During June the steamer which it is intended to use for removing the old unserviceable property and distributing it to other works was engaged in making surveys. After the survey work is completed it is expected to load the property on the barge and distribute such items thereof as are serviceable and will be required on other works, the remainder to be brought to Portland for condemnation.

Money statement.

July 1, 1904, balance unexpended.....	\$4, 431. 55
June 30, 1905, amount expended during fiscal, year for maintenance of improvement.....	3, 114. 86
July 1, 1905, balance unexpended .....	1, 316. 69
July 1, 1905, outstanding liabilities .....	94. 00
July 1, 1905, balance available.....	1, 222. 69

APPROPRIATIONS.

June 14, 1880 .....	\$40, 000. 00	June 3, 1896 .....	\$25, 000. 00
March 3, 1881.....	10, 000. 00	Deposited account sales:	
August 2, 1882.....	60, 000. 00	August 17, 1903 .....	4. 00
July 5, 1884.....	50, 000. 00	December 31, 1903.....	861. 93
August 5, 1886 .....	75, 000. 00	January 4, 1904 .....	204. 65
August 11, 1888 .....	150, 000. 00	June 23, 1904 .....	263. 48
September 19, 1890 .....	165, 000. 00		
July 13, 1892.....	85, 000. 00	Total .....	711, 334. 06
August 18, 1894 .....	50, 000. 00		

COMMERCIAL STATISTICS.

The following commerce was carried by vessels across the bar at the entrance to Yaquina Bay during the year ending December 31, 1904:

Articles.	Inbound.	Outbound.	Articles.	Inbound.	Outbound.
	Tons.	Tons.		Tons.	Tons.
Coal .....	44	.....	Miscellaneous .....	182	386
Chittim bark .....	23	.....	Flour and feed .....	8	462
Lumber .....	2	.....	Total .....	259	854
Machinery .....	.....	6			

Number of passengers arrived by sea, 59; departed by sea, 31.

List of vessels crossing the bar at entrance to Yaquina Bay, Oregon, during the year ending December 31, 1904.

Name.	Character.	Length.	Breadth.	Depth of hold.	Draft when fully laden.	Net tonnage.	Times arrived.	Times departed.	Times arrived and departed.
		Fect.	Fect.	Fect.	Fect.				
Berwick .....	Sail .....	82.6	27.4	7.1	.....	95	1	1	2
Gerald C. ....	do .....	58.5	18.0	5.2	6.0	24	9	9	18
Heather .....	Steam .....	165.0	28.5	14.9	14.0	.....	1	1	2
Hunter .....	do .....	95.0	21.7	10.4	11.0	52	1	1	2
L. Roscoe .....	do .....	85.5	22.0	9.0	9.0	75	9	9	18
Manzanita .....	do .....	152.0	26.0	11.5	13.0	.....	2	2	4
Robarts .....	do .....	75.5	18.2	6.5	8.6	24	13	13	26
Toledo .....	do .....	107.0	21.0	10.0	11.0	72	2	2	4
W. H. Harrison .....	do .....	92.0	20.1	6.8	8.0	52	9	9	18
Total .....	.....	.....	.....	.....	.....	.....	47	47	94

U U 7.

IMPROVEMENT OF TILLAMOOK BAY AND BAR, OREGON.

Information concerning the completed project for obtaining a least depth of 9 feet at mean high tide in the channel between Hobsonville, on Tillamook Bay, and Tillamook City, on Hoquarten Slough, as well as the results of operations in former years, is given in the summary of this report.

At the close of the last fiscal year operations had been suspended since the previous December.

OPERATIONS DURING THE FISCAL YEAR 1905.

In February and March, 1904, the freshets in the rivers tributary to the bay had brought down an unusual amount of sand and gravel, which had decreased the depth on some of the shoals in the bay and deposited some new snags in the channel.

In July, 1904, the Government plant was put in commission again, and the work of redredging the shoals in Hoquarten Slough and at Junction Island and Long Jetty commenced by hired labor. With the small balance available the dredge was operated about two months and 16,750 cubic yards removed and the projected depth of not less than 9 feet at mean high tide restored.

To check the deposit of sand and gravel in Hoquarten Slough, carried into it from the North Fork of the Trask River through Stillwell



Ditch, a jam of snags between three rows of piles was placed in the North Fork just above the county bridge, and at the same time the worst obstructions were cleared from the South Fork, in the hope of diverting most of the flow of the Trask out of the South Fork instead of through Stillwell Ditch. An unusually heavy freshet carried out the barrier, however, but it nevertheless enlarged the flow through the South Fork, and less sand and gravel were deposited in Hoquarten Slough.

Hoquarten Slough was snagged from Tillamook City to its mouth and all overhanging trees were cut down.

All work ceased by November 1, 1904, and the plant was put in charge of a watchman.

The river and harbor act of March 3, 1905, appropriated \$10,000 for this work, and as soon as these funds were available work was commenced in repairing the dredge scow and putting the plant in order. The scow was calked, the house enlarged, and a new mast and boom put in. A new and large hoisting engine was purchased, and it is proposed to operate the dredge by hired labor with the available funds, and dredge any accumulation of sand and gravel from the shoals that may have been deposited since work ceased and restore the channel to its projected depth.

Most of the repairs to the plant were finished by June, and during that month Hoquarten Slough was thoroughly snagged.

It is estimated that \$10,000 will be needed every two years to maintain the project, and that amount is therefore named in the money statement as a profitable expenditure for maintenance of the work and should be appropriated.

Money statement.

July 1, 1904, balance unexpended .....	\$9,518.11
Amount appropriated by river and harbor act approved March 3, 1905 ..	10,000.00
	<hr/>
	19,518.11
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	9,471.63
	<hr/>
July 1, 1905, balance unexpended .....	10,046.48
July 1, 1905, outstanding liabilities .....	2,391.00
	<hr/>
July 1, 1905, balance available .....	7,655.48
	<hr/> <hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	10,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

August 11, 1888 .....	\$5,200.00	Refundment of overpayments,	
September 19, 1890 .....	500.00	November 10, 1900.....	\$4.68
July 13, 1892.....	15,000.00	June 13, 1902.....	27,000.00
August 18, 1894 .....	16,000.00	March 3, 1905 .....	10,000.00
June 3, 1896.....	17,000.00		<hr/>
March 3, 1899 .....	25,000.00	Total .....	115,704.68

## COMMERCIAL STATISTICS.

The following commerce was carried by vessels across the bar at the entrance to Tillamook Bay, Oregon, during the year ending December 31, 1904:

Articles.	Inbound.	Outbound.	Articles.	Inbound.	Outbound.
	Tons.	Tons.		Tons.	Tons.
Eggs.....	1	.....	Logs .....	.....	350
Fruit .....	2	.....	Miscellaneous .....	3,196	2,432
Grain.....	25	.....	Total .....	3,239	10,584
Hay .....	15	.....			
Lumber .....		7,802			

Number of passengers arriving and departing by sea during the year, 1,503.

*List of vessels crossing the bar at entrance to Tillamook Bay, Oregon, during the year ending December 31, 1904, which proceeded as far as or departed from Tillamook City, Oreg.*

Name.	Character.	Length.	Breadth.	Depth of hold.	Draft when fully laden.	Net tonnage.	Times arrived.	Times departed.	Times arrived and departed.
		<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>				
C. T. Hill .....	Sail.....	93.0	30.2	7.5	9.0	133	2	3	5
Della .....	Gasoline..	45.1	14.5	4.4	.....	20	1	.....	1
Gem .....	Sail.....	106.0	30.0	7.0	11.0	114	1	1	2
Geo. R. Vosburg....	Steam .....	75.5	20.0	8.7	9.0	66	12	13	25
Gerald C. ....	Sail.....	58.5	18.0	5.2	6.0	24	1	1	2
Sue H. Elmore.....	Steam .....	90.7	23.8	8.0	10.5	131	43	43	86
Volant .....	Sail.....	122.8	29.0	8.9	.....	164	1	1	2
W. H. Harrison.....	Steam .....	92.0	20.1	6.8	.....	52	2	2	4
Total .....							63	64	127

*List of vessels crossing the bar at entrance to Tillamook Bay, Oregon, during year ending December 31, 1904, which did not go above nor depart from above Hobsonville, Oreg.*

Name.	Character.	Length.	Breadth.	Depth of hold.	Draft when fully laden.	Net tonnage.	Times arrived.	Times departed.	Times arrived and departed.
		<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>				
C. T. Hill .....	Sail.....	93.0	30.2	7.5	9.0	133	4	4	8
Glen .....	do .....	106.6	29.0	8.3	.....	121	1	1	2
Jennie Stella .....	do .....	132.0	34.4	9.8	.....	278	1	1	2
John F. Miller.....	do .....	107.0	30.6	9.0	12.0	170	1	1	2
Melville Dollar.....	Steam .....	239.1	38.0	14.0	16.0	1,103	1	1	2
Oakland .....	Sail.....	148.0	35.6	9.5	.....	383	1	1	2
Volant.....	do .....	122.8	29.0	8.9	.....	164	3	3	6
Total .....							12	12	24

## U U 8.

### IMPROVING THE VARIOUS HARBORS ON THE COAST OF OREGON SOUTH OF THE COLUMBIA RIVER BY THE CONSTRUCTION AND EQUIPMENT OF A DREDGING PLANT FOR USE THEREON.

The existing projects providing for the improvement of the various harbors, with status of improvement, will be found in the summary of the annual report pertaining to each work.

This new project for the construction of a dredging plant for use on these harbors is based on a letter submitted by the district officer under date of June 7, 1904. The recommendation is concurred in by the division engineer and approved by the Chief of Engineers.

The harbors now under improvement by the General Government are Tillamook Bay and bar, Yaquina Bay, Siuslaw River, Coos Bay and Harbor (including Coos River), and the Coquille River, Oregon.

It frequently happens that shoals are formed in the navigable channels, thereby greatly delaying the shipping and requiring immediate removal. There are no suitable dredging plants owned by contractors at these harbors and heretofore, owing to the inadequacy of funds for the purchase of suitable appliances, such work has been done by small bucket dredges operated by hired labor and ill adapted in many cases to the character of the work. It is therefore thought that it would be advantageous to have a small combined dipper and suction dredge which could be taken from harbor to harbor as the necessity for its use might arise and funds be available.

It is estimated that a suitable combination dredge, together with two dump scows for use at the Oregon coast harbors, can be built for about \$50,000. The funds for operating this plant would be taken each year from those available for improvement or maintenance of the particular stream upon which used. For the construction of the dredge and scows, however, a special appropriation should be made.

Should funds be made available, it is proposed to construct the dredge under contract.

There are no private dredging plants at either of the coast harbors, and the expense of taking a plant from the Columbia River, with the attendant risk in towing, would make the cost of dredging prohibitive if undertaken by contract.

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## U U 9.

### IMPROVEMENT OF UPPER COLUMBIA AND SNAKE RIVERS, OREGON, WASHINGTON, AND IDAHO.

For details of this project, with status of improvement, attention is invited to the summary of this report.

#### OPERATIONS DURING THE FISCAL YEAR 1905.

The work of improvement on the upper Columbia and Snake rivers has consisted entirely of dredging operations on the stretch between Lewiston and Riparia. The self-propelling dredge *Wallowa*, which at the beginning of the fiscal year was under construction, was completed and put in commission November 29, 1904.

During December and until January 14 the dredge was engaged in raking and dredging Log Cabin and Offields bars, these being the shoalest points between Lewiston and Riparia. The controlling depths on these bars before raking and dredging were from 2½ to 3 feet and were increased to 4½ feet. At Offields bar some 2,500 cubic yards of gravel were removed from the channel by dredging. On January 14 the dredge was laid up at the Lewiston moorings because of threatening freeze up on the river, and at the close of the fiscal year is still out of commission because of high water. No work has been done on the river above Lewiston during the year.

Regular boats have operated throughout the year between Riparia and Lewiston and intermittently above Lewiston as far as Imnaha

during moderate river stages. In June of the present year, on the occasion of the opening of the State Portage Railway, between The Dalles and Celilo, the steamer *Mountain Gem* made the run over the Snake and Columbia rivers from Lewiston to Celilo and return with the river at about a 9-foot stage. This was the first continuous navigation by steamer over this stretch for some twenty-three years and was made without interruption.

The river and harbor act of March 3, 1905, appropriated \$25,000 for this improvement, and the project for expenditure of the funds provides for their use in operating the dredge between Lewiston and Imnaha, making repairs to existing dams, in blasting out rocks from the channel, and in making survey between Eureka and Pittsburg Landing, which had been delayed on account of lack of funds.

At the close of the fiscal year, the June high water in the Snake River is receding and it is expected to begin operations with the dredge early in July.

The dredge constructed during the year has demonstrated that improvement by means of dredging will be economical, and this dredging plant will also furnish means of transportation and will facilitate the work of blasting out ledges and rocks on the upper reaches.

It is believed, with the dredging plant available, that \$12,000 will be sufficient for operating it and for blasting operations. This sum is therefore named in the money statement as a profitable expenditure and is the least amount that should be made available.

*Money statement.*

July 1, 1904, balance unexpended .....	\$43, 658. 01
Amount appropriated by river and harbor act approved March 3, 1905 ..	25, 000. 00
	<hr/>
	68, 658. 01
June 30, 1905, amount expended during fiscal year:	
For works of improvement.....	\$14, 082. 90
For maintenance of improvement .....	27, 066. 07
	<hr/>
	41, 148. 97
July 1, 1905, balance unexpended .....	27, 509. 04
July 1, 1905, outstanding liabilities .....	582. 00
	<hr/>
July 1, 1905, balance available .....	26, 927. 04
	<hr/>
Amount (estimated) required for completion of existing project .....	Indefinite.
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30,	
1907, for maintenance of improvement, in addition to the balance	
unexpended July 1, 1905 .....	
Submitted in compliance with requirements of sundry civil act of	
June 4, 1897, and of section 7 of the river and harbor act of 1899.	
	12, 000. 00

APPROPRIATIONS.

Upper Columbia River:	
June 10, 1872 .....	\$50, 000. 00
June 23, 1874 .....	20, 000. 00
March 3, 1875.....	35, 000. 00
	<hr/>
	\$105, 000. 00
Upper Columbia and Snake rivers:	
August 14, 1876.....	15, 000. 00
June 18, 1878 .....	20, 000. 00

Upper Columbia and Snake rivers—Continued.

March 3, 1879.....	\$20,000.00	
June 14, 1880 .....	15,000.00	
March 3, 1881.....	15,000.00	
August 2, 1882 .....	6,000.00	
July 5, 1884.....	20,000.00	
August 5, 1886 .....	10,000.00	
August 11, 1888 .....	10,000.00	
September 19, 1890.....	20,000.00	
July 13, 1892.....	15,000.00	
August 18, 1894 .....	5,000.00	
June 3, 1896 .....	5,000.00	
March 3, 1899.....	7,500.00	
June 13, 1902 .....	40,250.00	
June 13, 1902, balance tranferred from improvement of Clearwater River, Idaho .....	12,294.41	
Allotted from emergency act of June 13, 1902 .....	5,500.00	
March 3, 1905.....	25,000.00	
		\$266,544.41
December 30, 1897, reimbursement for property .....		414.00
July 12, 1899, reimbursement for property .....		365.00
January 29, 1901, reimbursement for property.....		43.70
August 17, 1903, reimbursement for property.....		3.00
Aggregate .....		372,370.11

EMERGENCY CONTRACTS IN FORCE.

Name of contractor: Joseph Supple, Portland, Oreg.  
Date of contract: March 17, 1904.  
Character of work: Constructing and delivering boat.  
Amount of work: Hull and house for self-propelling dredge.  
Price: \$12,065.  
Approval: Contract authorized by Chief of Engineers, February 20, 1904.  
Date of beginning: Within fourteen days from date of contract.  
Date of expiration: One hundred and twenty days from date of beginning.  
Extension: Time for completion extended a reasonable period.  
Completed: November 29, 1904.

Name of contractor: Columbia Engineering Works, Portland, Oreg.  
Date of contract: March 17, 1904.  
Character of work: Furnishing and installing machinery.  
Amount of work: Propelling machinery for self-propelling dredge.  
Price: \$11,290.  
Approval: Contract authorized by Chief of Engineers, February 20, 1904.  
Dates of beginning and expiration: Delivery to be completed not later than August 1, 1904.  
Extension: Time for completion extended a reasonable period.  
Completed: November 29, 1904.

Name of contractor: Featherstone Foundry and Machine Company, Chicago, Ill.  
Date of contract: March 25, 1904.  
Character of work: Furnishing and installing machinery.  
Amount of work: Dredging machinery for self-propelling dredge.  
Price: \$9,400.  
Approval: Contract authorized by Chief of Engineers, February 20, 1904.  
Dates of beginning and expiration: To be delivered and installed not later than August 1, 1904.  
Extension: Time for completion extended a reasonable period.  
Completed: November 29, 1904.

## COMMERCIAL STATISTICS.

The following commerce was carried on the Upper Columbia and Snake rivers during the year ending December 31, 1904:

Articles.	Tons.	Articles.	Tons.
Coal.....	105	Lumber.....	1,558
Flour and feed.....	342	Machinery.....	142
General merchandise.....	7,740	Shingles.....	52
Grain.....	32,348	Wool.....	31
Hay.....	24		
Live stock.....	1,205	Total.....	43,547

Passengers carried, 13,274.

## U U 10.

### IMPROVEMENT OF COLUMBIA RIVER BETWEEN THE FOOT OF THE DALLES RAPIDS AND THE HEAD OF CELILO FALLS, OREGON AND WASHINGTON.

For details of this work, with status of the project, attention is invited to the summary of this report and to report of Board of Engineers printed in the Annual Report of the Chief of Engineers for 1904, page 3475.

#### OPERATIONS DURING THE FISCAL YEAR 1905.

The work in progress during the fiscal year has consisted in making surveys to determine quantities and character of material to be excavated, obtaining data in connection with right of way secured from the State of Oregon, locating and fixing the definite lines for the canal, and in working up details of lock and masonry construction. Work has also been in progress for the removal of submerged rocks and reefs in the vicinity of Three Mile Rapids under contract dated April 12, 1904, with Robert Wakefield, of Portland, Oreg.

The survey work in the field was in progress up to December 31, when the party was disbanded and the assistants came to Portland, and since then have been engaged in working up the details for future use.

The contract with Robert Wakefield provided that the work should be completed by May 31, 1905, but on account of the annual freshet in the Columbia River, and also due to slowness in getting his plant ready for operations, nothing was accomplished until November. He was forced to suspend work on April 26 on account of high water and applied for an extension of time in which to complete the work, which application was approved. During the time that work was in progress under this contract a total of 15,565 cubic yards of class A rock and 3,852 cubic yards of class B rock was removed.

Upon completion of work under this contract the channel will have a width of 250 feet or more at extreme low water, with a least depth of 10 feet, except at one point where the channel, with 10 feet depth at low water, narrows to 200 feet.

On December 23, 1903, the State of Oregon appropriated \$100,000 with which to acquire right of way for the canal to be deeded to the United States free of cost. The boundary lines were run and descrip-



tions and forms of deeds submitted to the State board of canal commissioners. Due to the very limited amount of land available at some points and the necessity of not disturbing existing fishing rights or the tracks of the Oregon Railroad and Navigation Company, much adjusting of claims was necessary, which, coupled with the condemnation proceedings, caused the work to move very slowly, so that the deeds conveying the right of way were not secured until April. These deeds have been approved, and the total area of land conveyed to the United States is approximately 479 acres.

On February 17, 1903, the State of Oregon appropriated \$165,000 for building a portage road around the obstructions in the Columbia River between Big Eddy and Celilo. This road was completed during the year, and opened to traffic on June 3, 1905. Near the head of Five Mile and Ten Mile rapids, permission was given the State to use a portion of the right of way for the portage road. It is believed that this portage road will be of material benefit to the United States during the construction of the canal, which it so closely parallels, in giving advantage of water transportation for nearly all material that will be needed.

The river and harbor act of March 3, 1905, appropriated \$50,000 for continuing the improvement and authorized contract or contracts not exceeding in the aggregate \$250,000, exclusive of the amounts heretofore appropriated.

A project for the expenditure of these funds was submitted under date of March 24, 1905, and was approved by the Secretary of War under date of May 8, 1905. It provides for the construction, under contract, of a portion of the canal and locks at the upper or Celilo end and includes the building of a lock, except the gates and maneuvering machinery, the excavation of the canal prism to a point about 2,500 feet below the entrance to the Columbia River at Celilo, building the necessary walls, flooring the canal bottom and making back fill behind walls, and, in general, completing the canal for a distance of 2,500 to 3,000 feet at and just below Celilo, the estimated cost being \$373,675.50.

Specifications covering all of the work proposed under the above-mentioned project have been approved, and at the close of the fiscal year were in the hands of the printer. The proposals are to be opened on August 3, 1905.

The construction of the whole work should be placed under the continuing contract system, as its early completion is of great importance and will be of vast benefit to the inhabitants of the territory drained by the Columbia River. It is considered that under the continuing contract system, and provided sufficient funds are made available, a considerable saving in cost will be made.

It is estimated that \$1,250,000, including amount authorized under continuing contract, can be profitably expended during the fiscal year ending June 30, 1907, and this amount is accordingly named in the money statement and should be appropriated, and the balance to complete the project made available under continuing contract.

There is transmitted herewith an index map showing the location of the proposed work and line of canal construction.

Capt. Amos A. Fries, Corps of Engineers, has been in local charge of this work and was assisted by Mr. Frederick C. Schubert, junior engineer.



*Money statement.*

July 1, 1904, balance unexpended.....	\$291,682.36
Amount appropriated by river and harbor act approved March 3, 1905.....	50,000.00
	<hr/>
	341,682.36
June 30, 1905, amount expended during fiscal year, for works of improvement.....	63,132.76
	<hr/>
July 1, 1905, balance unexpended.....	278,549.60
July 1, 1905, outstanding liabilities.....	5,529.00
	<hr/>
July 1, 1905, balance available.....	273,020.60
	<hr/>
July 1, 1905, amount covered by uncompleted contracts.....	75,500.00
	<hr/>
Amount (estimated) required for completion of existing project.....	3,783,392.64
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905.....	
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	
	1,250,000.00

## APPROPRIATIONS.

August 18, 1894.....	\$100,000
June 3, 1896.....	150,000
April 28, 1904.....	100,000
March 3, 1905.....	50,000
	<hr/>
Total .....	400,000

## FORMAL CONTRACT IN FORCE.

Name of contractor: Robert Wakefield, Portland, Oreg.  
Date of contract: April 12, 1904.  
Character of work: Excavating and removing rock.  
Approximate quantities to be excavated and removed: 50,000 cubic yards of rock of class A (above low water); 7,000 cubic yards of rock of class B (below low water).  
Prices: \$1.50 per cubic yard for rock of class A; \$6.25 per cubic yard for rock of class B.  
Approved: May 3, 1904.  
Date of beginning: Thirty days after date of notification of approval.  
Date of expiration: May 31, 1905.  
Extension: Time for completion extended a reasonable period. (In force June 30, 1905.)

## U U II.

## CANAL AT THE CASCADES, COLUMBIA RIVER, OREGON.

The project for overcoming the obstructions in the Columbia River at the Cascades, Oregon, and the results of operations in former years, are set forth in the summary of this report.

## OPERATIONS DURING THE FISCAL YEAR, 1905.

There were no active operations carried on during the past year in connection with completing the lock walls or on any of the items of the approved project until after the passage of the river and harbor act of March 3, 1905, which appropriated \$30,000 for continuing the work.

# Neinity Map COLUMBIA RIVER

from

I

## ALLES TO CELILO

### OREGON

Scale 1:40 000

1000 2000 3000 4000 5000 ft.



W.C. LANGFISH  
Major, Corps of Engineers  
U.S. Army.

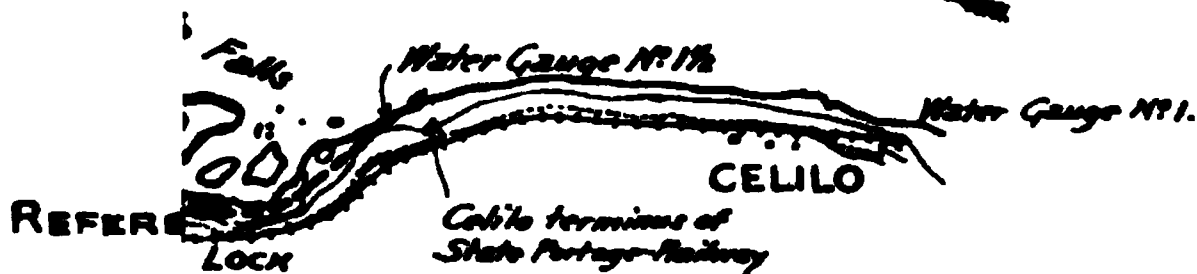
Report for  
June 30, 1905.

W.C. Langfish

Major, Corps of Engineers  
U.S. Army.

Gauge No. 3.

1



REFER

LOCK

Celilo terminus of  
State Portage Railway

CELILO

Canal and Locks.  
High Water line of 18.

Portage Railway, recently  
N. Ry. In general,



The project for expenditure of these funds provides for completing the slope pavement on the south side of the canal between the lower and middle lock gates and moving old buildings, grading, soiling and seeding the grounds, and the construction of three small wooden dwellings for lock tenders' quarters, a small stable, and one machine and carpenter shop. The construction of the buildings is to be done under contract, and during May the work of grading the grounds and removing the old buildings was commenced, and at the close of the fiscal year this work is well advanced.

Specifications have been prepared covering the construction of the buildings under contract, and these were approved and at the close of the fiscal year were in the hands of the printer. The proposals for constructing buildings will be opened early in August, and it is probable that the buildings will be completed during the fall and early winter.

During the low water season last fall some work was done on the channel leading to the canal at what is known as Sheridans Point. The work consisted in blasting some large boulders which were complained of by masters of boats as being an obstruction to navigation at about a 15-foot stage. The point of rocks was blasted away and the slope paved with the large spawls and loose rocks, and it is believed that no further trouble at this place will be experienced.

During February the water reached a very low stage, or 1.5 feet below low water. During this low-water period one of the steamers passing the locks struck a reef at the upper summit of the rapids just below the lower entrance to the canal. It was ascertained that this reef extends across the channel, but as the river had never before been navigated at that stage of water the presence of the reef was unknown.

The next important work to be undertaken is the completion of the land wall of the upper lock. The earth bank now takes the place of the lock wall, and this, besides making the lockages slower and unsatisfactory, is liable to cause injury to the work by allowing water pressures on the uncompleted lower wing wall with a tendency to cause scour under it.

The estimated cost of this item is approximately \$100,000 and this sum is named in the money statement and should be made available before the work is undertaken.

Mr. W. L. Clark, inspector, has been in immediate charge of the work during the past year.

For commercial statistics, etc., see report for operating and care of canals and locks at the cascades of the Columbia River, Oregon.

#### *Money statement.*

July 1, 1904, balance unexpended.....	\$7,491.54
Amount appropriated by river and harbor act approved March 3, 1905..	30,000.00
Deposited account proceeds Government property.....	317.60
	<hr/>
	37,809.14
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	4,485.90
	<hr/>
July 1, 1905, balance unexpended.....	33,323.24
July 1, 1905, outstanding liabilities.....	1,759.00
	<hr/>
July 1, 1905, balance available.....	31,564.24
	<hr/>

Amount (estimated) required for completion of existing project.....	\$199,260.00
<hr/>	
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905.....	
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	100,000.00

APPROPRIATIONS.

August 14, 1876.....	\$90,000.00	June 3, 1896.....	\$50,000.00
June 18, 1878.....	150,000.00	June 11, 1896.....	179,597.00
March 3, 1879.....	100,000.00	March 3, 1899.....	75,000.00
June 14, 1880.....	100,000.00	June 13, 1902.....	30,000.00
March 3, 1881.....	100,000.00	Deposited to credit of appropriation, account sales:	
August 2, 1882.....	265,000.00	January 5, 1903.....	6,100.00
July 5, 1884.....	150,000.00	August 24, 1904.....	317.60
August 5, 1886.....	187,500.00	March 3, 1905.....	30,000.00
August 11, 1888.....	300,000.00		
September 19, 1890.....	435,000.00		
July 13, 1892.....	326,250.00	Total .....	3,814,417.60
March 3, 1893.....	1,239,653.00		

U U 12.

OPERATING AND CARE OF CANAL AND LOCKS AT THE CASCADES OF THE COLUMBIA RIVER, OREGON.

The canal and locks around the cascades of the Columbia River, about 150 miles above the mouth of the latter in the Pacific Ocean, and which, although incomplete, enable steamboats drawing 8 feet to run as far upstream as The Dalles, Oreg., about 200 miles above the mouth, were formally opened to navigation November 5, 1896.

OPERATIONS DURING THE FISCAL YEAR 1905.

During the fiscal year the locks have been continuously operated for passage of river boats.

No work was in progress during the year aside from the regular work of operating and caring for the locks and grounds.

During August and September the lock walls were cleaned of the deposit that had accumulated during previous high waters and which was used in surfacing the ground at the east end of the reservation. A wagon road was also constructed leading from the landing slip in the upper entrance to the county road at a point near the east boundary of the reservation.

The sediment deposited in the canal entrances during the previous high water, and which was from 4 to 6 feet in depth, caused considerable trouble to navigation early in the fall, and removing this deposit to a certain extent was accomplished by means of dragging an anchor over the canal floors and sluicing it out by the current through the canal.

On the land side of the lower entrance a gravel bar was formed by the eddy or back current which extends to the center of the channel, while on the river side a bar was formed by the high water washing all boulders and loose rock from the island back of the protection

wall. These bars on each side of the canal left only about 50 feet of crooked channel between them, and during the next low water these bars will undoubtedly have to be removed by dredging.

The painting of the steel-lock gates was commenced in August and was continued as weather conditions permitted. A good season's work was accomplished.

New cables were put in during the year as follows: Lower cables on the north and south leaves of lower gate; upper cable on south leaf of lower gate, and also cable on south leaf of middle gate.

The spring high water of 1904 did some damage by washing the ground away from the toe of the protection wall at the head of the island and threatened the foundation of the wall. This work was repaired during January and February by filling in with coarse rubblestone and constructing a barrier of stone to lessen the current at this point. The valve of the culvert on the south side at the lower lock gate began to give trouble in November and at times refused to work when the pressure of water against it was heavy and could not be opened until the water in the lock chamber had been lowered and the pressure reduced.

A report on the condition of this valve was submitted under date of May 12, 1905, and an allotment of \$3,000 was made under date of May 24 for making necessary repairs and changes which will obviate future trouble.

Repairs to this valve necessitated bulkheading the culverts leading from the main culvert to the lock chamber. These bulkheads were placed during June, and on the 28th of June the pumps for pumping out the culvert were started.

The valve on the north side at the lower gate is also out of order, and the estimate of funds required for the fiscal year 1906 included \$3,000 for its repair.

The work has been under the immediate supervision of Mr. W. L. Clark, inspector.

#### *Money statement.*

July 1, 1904, balance unexpended.....	\$1,937.49
Allotted June 25, 1904 .....	7,100.00
Allotted May 24, 1905.....	3,000.00
	<hr/>
	12,037.49
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	8,931.67
	<hr/>
July 1, 1905, balance unexpended.....	3,105.82
July 1, 1905, outstanding liabilities.....	1,182.00
	<hr/>
July 1, 1905, balance available.....	1,923.82

#### ALLOTMENTS.

November 4, 1896.....	\$2,500.00	July 19, 1901 .....	\$2,243.63
May 21, 1897 .....	350.00	July 12, 1902 .....	5,500.00
August 21, 1897.....	4,000.00	July 8, 1903 .....	5,000.00
October 30, 1897 .....	1,500.00	June 24, 1904.....	7,100.00
July 26, 1898 .....	13,869.36	May 24, 1905 .....	3,000.00
July 22, 1899 .....	3,047.77		<hr/>
July 25, 1900 .....	11,121.41	Total .....	59,232.17

2464 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Detailed statement of expenditures for operating and care of canal and locks, Columbia River, Oregon, during the fiscal year ending June 30, 1905.

Month.	Labor.	Materials for repairs.	Tools, fuel, oil, etc.	Office expenses, superintendence, and contingencies.	Total.
1904.					
July .....	\$213.25	\$12.75	\$2.50	\$17.00	\$245.50
August .....	206.00	163.75		340.00	709.75
September .....	387.00	25.71			412.71
October .....	1,870.50	87.73	101.21	192.48	2,201.92
November .....	1,139.15	217.50	158.71		1,515.36
December .....	523.82	182.52	9.20	12.00	727.04
1905.					
January .....	510.88			57.10	567.98
February .....	296.25	102.00			398.25
March .....	298.00				298.00
April .....	234.50	85.72	6.00	25.56	351.78
May .....	508.34	11.65	32.05		552.04
June .....	794.75	51.79	104.32	.48	951.34
Total .....	6,981.94	891.12	413.99	644.62	8,931.67

Summary of expenditures made on operating and caring for canal and locks, Columbia River, Oregon, during the fiscal year ending June 30, 1905, submitted in compliance with river and harbor act of July 5, 1884.

Items of estimate.	Amount.
Labor .....	\$6,981.94
Materials for repairs .....	891.12
Tools, fuel, oil, etc .....	413.99
Office expenses, superintendence, and contingencies .....	644.62
Total .....	8,931.67

COMMERCIAL STATISTICS.

Canal at Cascades, Oregon—Summary of business, etc., during fiscal year ending June 30, 1905.

Month.	Average gauge readings, 12 m.		Number of lock-ages.	Locks operated.	Number of passages.			
	Upper.	Lower.			Stern-wheel.	Pro-peller.	Barge or sail.	Total.
1904.								
July.....	113.5	100.5	92	h. m. 24 5	92			92
August.....	105.4	86.7	106	18 20	102	4		106
September.....	100.6	79.5	108	18 0	108			108
October.....	97.8	75.1	125	24 45	119	6		125
November.....	96.6	73.8	113	23 55	111	2		113
December.....	96.6	73.5	73	15 30	67	6		73
1905.								
January.....	96.2	72.9	34	6 50	34			34
February.....	96.6	72.1	18	6 20	18			18
March.....	99.5	77.6	54	9 10	46	8	1	55
April.....	101.2	80.2	74	14 50	74			74
May.....	102.5	87.0	108	25 20	108			108
June.....	72.5	52.1	114	29 30	109	4	1	114
Total.....			1,019	214 35	988	30	2	1,020



*Canal at Cascades, Oregon—Summary of business, etc., during fiscal year ending  
June 30, 1905—Continued.*

Month.	Registered tonnage.	Freight carried.	Passen- gers.	Vessels delayed.	
				Number.	Delay.
1904.		<i>Tons.</i>			<i>h. m.</i>
July .....	35,330	1,779.75	10,968		
August .....	39,133	2,889.75	9,235		
September .....	42,703	5,362.50	6,122		
October .....	45,214	5,842.75	4,185	1	0 30
November .....	43,711	4,847.25	3,323		
December .....	23,190	2,998.50	2,525		
1905.					
January .....	10,592	1,183.00	1,531		
February .....	5,544	1,042.50	856	1	3 20
March .....	14,380	2,555.50	2,331		
April .....	27,896	2,195.50	3,086		
May .....	44,235	1,989.75	6,832	2	0 55
June .....	47,145	2,479.25	13,409		
Total .....	379,078	35,166.00	64,403	4	4 45

*Statement of traffic passing through canal at the Cascades, Oregon, during fiscal year  
ending June 30, 1905.*

BOUND UP.

Month.	Wheat.	Flour.	Miscellane- ous grain.	Hay.	Cattle.	Horses.	Sheep.
1904.	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Tons.</i>			
July .....		6,000	14,000	8.00	19	187	70
August .....			24,000	33.00	69	128	
September .....	30,000		8,000	18.50	35	221	213
October .....		2,000		53.50	64	309	544
November .....			22,000	15.75	59	134	20
December .....			4,000	17.00	23	54	151
1905.							
January .....				11.00	10	40	132
February .....			2,000	6.50	34	57	66
March .....			2,000	4.00	46	167	104
April .....			4,000	1.00	28	125	70
May .....			2,000	1.00	21	164	
June .....				1.00	29	114	
Total .....	30,000	8,000	32,000	165.25	437	1,700	1,370

Month.	Miscella- neous live stock.	Wool.	Berries and fruit.	Lumber.	Miscella- neous merchan- dise.	Total cargo.	Passen- gers.
1904.		<i>Pounds.</i>	<i>Pounds.</i>	<i>Feet B. M.</i>	<i>Tons.</i>	<i>Tons.</i>	
July .....				3,500	839.75	987.50	6,001
August .....			1,500	8,300	782.50	955.50	4,502
September .....				3,000	789.25	998.00	2,886
October .....		4,000			944.00	1,250.75	1,989
November .....					918.25	1,059.75	1,430
December .....					508.50	580.25	1,122
1905.							
January .....	3			31,000	423.75	518.75	761
February .....				24,000	306.00	405.25	415
March .....				14,000	855.25	1,014.25	1,313
April .....				21,000	941.25	1,071.75	1,647
May .....				25,000	941.00	1,092.50	3,835
June .....	1			12,000	953.00	1,058.00	6,775
Total .....	4	4,000	1,500	141,800	9,202.50	10,992.25	32,676

## 2466 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

*Statement of traffic passing through canal at the Cascades, Oregon, during fiscal year ending June 30, 1905—Continued.*

## BOUND DOWN.

Month.	Wheat.	Flour.	Miscellaneous grain.	Hay.	Cattle.	Horses.	Sheep.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Tons.</i>			
1904.							
July .....	19,000	230,000	294,000	1.00	57	259	.....
August .....	1,269,000	360,000	753,000	13.00	44	187	1,000
September .....	6,781,500	95,000	426,000	30.00	190	271	.....
October .....	5,938,000	578,500	520,500	59.50	380	257	3,700
November .....	4,447,000	548,500	930,500	11.00	81	208	1,640
December .....	2,874,000	415,000	715,000	1.00	86	167	.....
1905.							
January .....	68,000	246,500	565,000	1.00	5	48	555
February .....	274,000	332,000	374,000	3.00	29	57	270
March .....	1,097,000	865,000	782,000	17.00	56	182	565
April .....	999,000	217,000	392,000	.....	3	117	.....
May .....	173,000	230,000	339,000	14.00	9	365	.....
June .....	1,483,000	179,000	206,000	.....	8	382	.....
Total .....	25,593,500	3,796,500	6,297,000	150.50	948	2,450	7,730

Month.	Miscellaneous live stock.	Wool.	Berries and fruit.	Lumber.	Miscellaneous merchandise.	Total cargo.	Passengers.
		<i>Pounds.</i>	<i>Pounds.</i>	<i>Feet B. M.</i>	<i>Tons.</i>	<i>Tons.</i>	
1904.							
July .....	30	.....	29,000	27,000	187.00	792.25	4,967
August .....	69	.....	321,500	5,700	366.50	1,934.25	4,733
September .....	185	.....	351,000	12,500	211.25	4,364.50	3,236
October .....	1,551	.....	166,500	3,700	274.00	4,592.00	2,196
November .....	1,303	.....	189,500	49,500	294.00	3,787.50	1,893
December .....	194	.....	180,000	14,800	142.00	2,418.25	1,403
1905.							
January .....	.....	.....	92,000	.....	112.25	664.25	770
February .....	.....	.....	65,000	.....	48.00	637.25	441
March .....	30	.....	117,500	9,000	189.00	1,541.25	1,018
April .....	.....	.....	58,500	2,000	213.00	1,123.75	1,439
May .....	.....	.....	23,000	7,000	258.00	897.25	2,997
June .....	46	4,000	79,500	1,000	198.00	1,421.25	6,634
Total .....	3,408	4,000	1,673,000	132,200	2,493.00	24,173.75	31,727

*List of vessels passing through canal at the Cascades, Columbia River, Oregon, during fiscal year ending June 30, 1905.*

Name.	Character.	Length.	Breadth.	Depth of hold.	Net tonnage.	Times passed through canal during fiscal year.
		<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>		
Bailey Gatzert.....	Stern-wheel steamboat .....	177.3	32.3	8.0	444	179
Barge .....	.....	.....	.....	.....	.....	2
Chalcha .....	Propeller steamboat .....	.....	.....	.....	.....	1
Chas. R. Spencer...	Stern-wheel steamboat .....	152.0	31.8	5.6	409	241
Dallas City .....	do.....	150.0	30.9	8.2	323	212
Gasoline launch .....	.....	.....	.....	.....	.....	1
Geo. W. Simons .....	Propeller steamboat .....	81.5	17.5	4.4	47	2
Glenola .....	Stern-wheel steamboat .....	139.6	28.2	5.4	276	8
Hercules .....	do.....	160.3	34.0	8.6	293	8
M. F. Henderson .....	do.....	168.7	31.0	7.5	315	26
Maja .....	Propeller steamboat .....	54.1	12.1	5.4	22	24
Metlako .....	Stern-wheel steamboat .....	109.0	24.4	4.8	122	2
Pearl .....	Propeller steamboat .....	44.7	10.2	3.6	8	1
Regulator .....	Stern-wheel steamboat .....	157.0	34.4	7.7	308	304
Resolute .....	Propeller steamboat .....	52.0	12.5	5.0	12	4
Tahoma .....	Stern-wheel steamboat .....	117.5	27.0	6.0	154	3
Undine .....	do.....	150.0	27.0	6.6	280	2
Total .....	.....	.....	.....	.....	.....	1,020

Meteorological and gauge records for the year.

Month.	Rainfall.	Days on which rain or snow fell.	Average temperature at 12 m.	Highest readings of gauges.		Lowest readings of gauges.	
				Head of canal.	Foot of canal.	Head of canal.	Foot of canal.
1904.	Inches.		°F.				
July .....	1.04	5	80.2	117.5	104.0	100.0	93.8
August .....	.31	2	84.4	108.4	91.6	102.5	82.6
September .....	.09	3	78.9	102.3	82.4	99.1	77.0
October .....	3.33	10	66.4	99.0	76.8	96.8	73.9
November .....	8.66	23	54.7	97.6	75.5	96.1	73.0
December .....	14.46	22	44.0	97.5	74.5	96.1	73.0
1905.							
January .....	5.18	15	41.2	97.7	74.7	95.0	71.6
February .....	4.18	10	43.8	97.2	74.8	94.5	70.5
March .....	8.97	18	59.0	101.2	80.2	96.2	72.9
April .....	1.49	7	66.6	104.8	85.4	100.2	78.6
May .....	4.75	16	67.0	108.0	91.4	104.0	84.4
June .....	1.08	9	72.5	115.2	101.8	108.5	92.0
Total .....	53.54	140	63.2				

	°F.
Highest reading at head of canal during the year.....	117.5
Highest reading at foot of canal during the year.....	104.0
Lowest reading at head of canal during the year.....	94.5
Lowest reading at foot of canal during the year.....	70.5

NOTE.—Reading of adopted low water at head of canal is 96; reading of adopted low water at foot of canal is 72.

U U 13.

IMPROVEMENT OF COLUMBIA RIVER BETWEEN VANCOUVER, WASHINGTON, AND MOUTH OF WILLAMETTE RIVER.

For details of this work, with status of improvement, attention is invited to the summary of this report and to report of the Board of Engineers, printed in the Annual Report of the Chief of Engineers for 1904, pages 3497 et seq.

OPERATIONS DURING THE FISCAL YEAR 1905.

No operations were in progress by the United States on this work during the fiscal year.

Some dredging was done during September, 1904, by the Columbia Contract Company, under permission of the Secretary of War. This dredging was necessary to allow of easy transportation of rock for the jetty at the mouth of the Columbia River.

It is believed that the dike at the head of Hayden Island has sustained no injury since the last annual report. At that time a very slight settlement of the brush and stone filling to the main dike was noticeable at a few points, and a small area of the revetment at the head of Hayden Island had commenced to slide into the channel in Oregon Slough.

The river and harbor act of March 3, 1905, appropriated \$30,000 for continuing the improvement in accordance with the project approved by the Board of Engineers for Rivers and Harbors, and provides for continuing contracts not to exceed in the aggregate \$30,000.

The project for the expenditure of these funds contemplates making the necessary repairs to the dike at the head of Hayden Island and



## APPENDIX V V.

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### IMPROVEMENT OF WILLAMETTE RIVER, AND OF COLUMBIA RIVER BELOW THE MOUTH OF THE WILLAMETTE, AND THEIR TRIBUTA- RIES, OREGON AND WASHINGTON.

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#### REPORT OF MAJ. W. C. LANGFITT, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905, WITH OTHER DOCUMENTS RELATING TO THE WORKS.

##### IMPROVEMENTS.

- |  |   |
|--|---|
| 1. Willamette River above Portland, Yamhill and Long Tom rivers, Oregon. | 5. Mouth of Columbia River, Oregon and Washington.          |
| 2. Operating and care of lock and dam in Yamhill River, Oregon.          | 6. Clatskanie River, Oregon.                                |
| 3. Columbia and lower Willamette rivers below Portland, Oregon.          | 7. Cowlitz and Lewis rivers, Washington.                    |
| 4. Columbia River below Tongue Point, Oregon.                            | 8. Gauging waters of Columbia River, Oregon and Washington. |

##### SPECIAL REPORT.

9. Willamette Falls, Willamette River, Oregon, water power.
- 

ENGINEER OFFICE, UNITED STATES ARMY,  
*Portland, Oreg., July 14, 1905.*

GENERAL: I have the honor to transmit herewith annual report  
\* \* \* for the fiscal year ending June 30, 1905, for works of river  
and harbor improvement in my charge.

Very respectfully, your obedient servant,

W. C. LANGFITT,  
*Major, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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## V V I.

### IMPROVEMENT OF WILLAMETTE RIVER ABOVE PORTLAND, AND YAM, HILL RIVER, INCLUDING THE MAINTENANCE OF LONG TOM RIVER. OREGON.

The details of this work, with status of improvement, are given in  
the summary of this report.

## OPERATIONS DURING THE FISCAL YEAR 1905.

The work of improvement on the upper Willamette River has consisted mainly of snagging and dredging and making a few minor repairs to the existing dams.

The snag boat *Mathloma* was in commission from July 7 to October 21, and during this period was employed in removing obstructions from the channel between Portland and Independence, making repairs to dams, and in towing dipper dredge *No. 2* from shoal to shoal. Dipper dredge *No. 2*, which at the beginning of the fiscal year was under construction, was completed and put in commission September 1. The dredge worked throughout the remainder of the low-water season on the gravel shoals between Portland and Salem and was laid up at Portland October 19. On May 10 the dredge was again put in commission and at the close of the year is at work on the upper river near Salem.

Dredging was done last low-water season at Candiani, Five Islands, Allisons, Eldridges, and Ash Island shoals; at the mouth of the Yamhill River and head of Clackamas Rapids, and during the present season on shoals at Clackamas Rapids, Candiani, Lamborts, and Independence. The dredged cuts have been made generally 40 feet in width, and to a depth of  $3\frac{1}{2}$  to 4 feet at low water, which provides ample channel for the passage of upper river boats and yet does not drain the pool above the shoals.

During the high-water period in March a number of snags were removed by blasting from the upper stretch of river between Corvallis and Peoria, thus enabling boats to safely navigate this stretch during high-water stage.

June 12 work was begun on the unfinished portion of the bank revetment near Independence. The total length of this revetment will be some 2,000 feet, 1,134 feet of which was constructed in 1893. At the close of the fiscal year this work is in progress and it is expected to complete it during the present low-water season.

The following is a summary of the work performed by the snag boat *Mathloma* and dipper dredge *No. 2* during the year:

*Snag boat Mathloma.*

Snags removed by boat .....	580
Snags removed by blasting .....	101
Snags and trees cut from banks .....	181
Total snags removed .....	862
Powder used .....	pounds.. 1,015
Miles run by boat .....	638
Wood consumed .....	cords.. 152
Dams repaired .....	linear feet.. 140

*Dipper dredge No. 2.*

Cubic yards gravel dredged .....	22,581
Length of channel cut .....	linear feet.. 6,174
Hours actual dredging .....	463
Hours moving and repairing .....	407
Distance moved .....	miles.. 220
Wood consumed .....	cords.. 67
Approximate cost per cubic yard .....	cents.. 12

The river and harbor act of March 3, 1905, appropriated \$50,000 for the work of this improvement, and the approved project for its expenditure is as follows:

Repairs and renewal of plant.....	\$19,000
Operation of snag boat and dredge.....	15,000
Completion of revetment at Independence.....	6,000
Repairs and extensions to dams, etc.....	4,000
Engineering, office expenses, maintenance, and contingencies.....	6,000
Total.....	50,000

The pile-driving plant was repaired during May, and preparation of plans and specifications for reconstruction of a hull for the snag boat *Mathloma* are now in progress. It is expected to do this work during the present summer and have the boat in readiness for operation early in the year 1906.

The only work done on the Yamhill River during the year was that of dredging a cut some 800 feet in length to a low-water depth of 4 feet through the shoal at its mouth. This shoal is formed each high-water season by gravel deposited from the Willamette River when in freshet.

Further careful consideration of the conditions governing navigation and freight traffic on the Yamhill River force the conclusion that the modification of the dam in connection with the lock near Lafayette, constructed by the Government, 1898–1900, and as submitted in report from this office under date of September 19, 1902, and printed in House Document No. 78, Fifty-eighth Congress, second session, should now be carried out or some other modification serving the same purpose should be made. This change in recommendation from the one made in the report above referred to seems justified by further observation and facts developed since date of previous report.

At the present time boats do not run on the Yamhill River regularly, on account of the interrupted lock service in winter caused by freshets. Over \$100,000 has been invested here and the amount estimated at \$28,560 for the modification is relatively so small that it is believed it should not stand in the way of making this improvement capable of giving that for which it was constructed, viz, uninterrupted service to the head of navigation.

The commerce now carried on is, for the reasons stated, very limited (for further information regarding commerce, etc., see report on Operating and Care of Lock and Dam in Yamhill River, Oregon), and, of course, it is possible that even with the modification boats may not run continuously above the locks. However, the improvement would, beyond doubt, tend toward a greater regulation of freight rates than at present, and by this indirect effect at least benefit those for whose use the lock was constructed to such extent as to render a further expenditure advisable. Under present conditions the past expenditures have been made practically to no effect and it is now not a question of entering on a work that is to cost \$125,000, which total expenditure might not seem justifiable, but rather that of expending only the comparatively small sum named above, \$28,560, to get such results as are possible from the improvement.

Of the amount (\$121,000) named in the money statement as a profitable expenditure, the sum of \$15,000 will be necessary for revetment near Wheatland, which should be built as soon as possible, and \$31,600



is the least amount required for dredging, snagging, and contingencies. These two amounts, or the sum of \$46,600, therefore, should be appropriated without fail. The balance, \$74,400, is allowed for revetment at Corvallis, Albany, and Salem, and for removal of rocks at Copeleys and Rock Island, which is a part of the general project and are next in order of importance.

This work has been in local charge of Mr. David B. Ogden, assistant engineer.

*Money statement.*

July 1, 1904, balance unexpended .....	\$35, 194. 82
Amount appropriated by river and harbor act approved March 3, 1905..	50, 000. 00
	<hr/>
	85, 194. 82
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	31, 178. 78
	<hr/>
July 1, 1905, balance unexpended .....	54, 016. 04
July 1, 1905, outstanding liabilities .....	1, 579. 00
	<hr/>
July 1, 1905, balance available.....	52, 437. 04
	<hr/>
Amount (estimated) required for completion of existing project.....	163, 500. 00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement.....	\$89, 400. 00
For maintenance of improvement .....	31, 600. 00
	<hr/>
	121, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

March 3, 1871 .....	\$16, 000	August 18, 1894 (of which \$2, 000 was allotted to Yamhill River) ..	\$23, 000
March 3, 1873 .....	3, 000	June 3, 1896 (Willamette and Yamhill rivers) .....	40, 000
June 23, 1874.....	7, 500	June 4, 1897 (Willamette and Yamhill rivers) .....	160, 000
March 3, 1875 .....	25, 000	Allotted from Emergency act, June 6, 1900.....	5, 000
August 14, 1876.....	20, 000	June 13, 1902.....	68, 000
June 18, 1878.....	20, 000	April 28, 1904 (allotted).....	12, 000
March 3, 1879 .....	12, 000	March 3, 1905 .....	50, 000
June 14, 1880.....	12, 000		<hr/>
March 3, 1881 .....	15, 000	Total .....	583, 500
August 2, 1882.....	5, 000		
July 5, 1884 .....	10, 000		
August 5, 1886.....	10, 000		
August 11, 1888.....	29, 000		
September 19, 1890 .....	11, 000		
July 13, 1892 (of which \$3,000 was allotted to Yamhill River) ..	30, 000		

NOTE.—By river and harbor act of March 3, 1899, \$3,000 was transferred to and expended on improvement of Long Tom River, Oregon.

EMEPGENCY CONTRACTS IN FORCE.

Name of contractor: Joseph Supple, Portland, Oreg.  
Date of contract: March 16, 1904.  
Character of work: Constructing and delivering boat.  
Amount of work: Hull and house for dredge.  
Price: \$6,350.

Approval: Contract authorized by Chief of Engineers, February 20, 1904.  
Date of beginning: Forty-four days from date of contract.  
Date of expiration: August 1, 1904.  
Extension: Date of expiration extended for a reasonable time.  
Completed: August 31, 1904.

Name of contractor: Featherstone Foundry and Machine Company, Chicago, Ill.  
Date of contract: March 25, 1904.  
Character of work: Furnishing and installing machinery.  
Amount of work: Dredging machinery for 1 dredge.  
Price: \$12,850.

Approval: Contract authorized by Chief of Engineers, February 20, 1904.  
Dates of beginning and expiration: Machinery to be installed on dredge not later than August 1, 1904.  
Extension: Date of expiration extended for a reasonable time.  
Completed: August 31, 1904.

COMMERCIAL STATISTICS.

The canal and locks at Oregon City, overcoming the falls of the Willamette River, are owned and operated by the Portland General Electric Company, and the following is a statement for the year ending December 31, 1904, of the traffic passing through them:

Articles.	Quantity.	Articles.	Quantity.
Grain .... tons..	2, 254	Paper ..... tons..	31, 153
Flour and mill stuff ..... do...	2, 161	Oil ..... do...	964
Coal ..... do...	1, 193	Lumber ..... feet B. M..	1, 545, 537
Wool ..... do...	216	Logs ..... do...	15, 843, 376
General merchandise ..... do...	19, 445	Wood ..... cords..	566
Potatoes ..... do...	3, 089	Passengers ..... number..	19, 744
Hops ..... do...	633	Cattle and horses ..... do...	982
Paper stock ..... do...	1, 050	Sheep and hogs ..... do...	281
Pulp ..... do...	994		

The following statement of traffic on the Willamette River above Portland has been compiled from reports of the various steamers and transportation companies doing business on this part of the river during the year ending December 31, 1904:

Articles.	Quantity.	Articles.	Quantity.
	<i>Tons.</i>		<i>Tons.</i>
Wheat .....	3, 856	Sheep and hogs (number, 557) .....	42
Other cereals .....	3, 588	Shingles .....	405
Flour and feed .....	1, 939	Lumber (1,882,880 feet B. M. ) .....	2, 448
Potatoes .....	6, 864	Logs (60,597,939 feet B. M. ) .....	121, 196
Fruit .....	366	Sand and gravel .....	50, 197
Fish .....	23	Stone .....	12, 149
Hops .....	461	Clay .....	1, 193
Hay .....	1, 178	Tan bark (470 cords) .....	235
Wool .....	77		
General merchandise .....	99, 413	Total .....	332, 180
Wood (16,956 cords) .....	25, 434		
Coal .....	823	Passengers carried ..... number..	65, 947
Cattle and horses (number 606) .....	243		

## V V 2.

OPERATING AND CARE OF LOCK AND DAM IN YAMHILL RIVER,  
OREGON.

## OPERATIONS DURING THE FISCAL YEAR 1905.

The lock was closed to navigation because of high water on November 20, 1904, and during the following winter months, until April 2, was closed to traffic forty-six days and open eighty-six days. Since April 2 the lock has been continuously available for navigation. The highest water of the year occurred December 31 and registered 11.1 feet above the top of the lock walls. No damage was done the lock, dam, or adjacent slopes.

During the year the lock, dam, adjacent grounds, and general property have been cared for and kept in repair.

*Detail summary of expenditures for operating and care of lock and dam in Yamhill River, Oregon, during fiscal year ending June 30, 1905.*

Month.	Operating and care.		Engineering, office expenses, and contingencies.	Total.
	Labor.	Materials.		
1904.				
July.....				
August.....	\$60.00			\$60.00
September.....	60.00	\$20.63	\$14.75	95.38
October.....	108.00	83.49		191.49
November.....	62.00			62.00
December.....	64.25	3.20		67.45
1905.				
January.....	63.00			63.00
February.....	64.00			64.00
March.....	60.00			60.00
April.....	60.00			60.00
May.....	62.00			62.00
June.....	100.00	103.81	285.00	488.81
Total.....	763.25	211.13	299.75	1,274.13

*Summary of expenditures made in operating and caring for lock and dam in Yamhill River, Oregon, during the fiscal year ending June 30, 1905, submitted in compliance with river and harbor act of July 5, 1884.*

Items of estimate.	Amount expended.
Operating and general care of lock.....	\$974.38
Engineering, contingencies, and office expenses.....	299.75
Total.....	1,274.13

*Money statement.*

July 1, 1904, balance unexpended.....	\$1,043.79
Allotted June 25, 1904.....	700.00
	1,743.79
June 30, 1905, amount expended during fiscal year, for maintenance of improvement.....	922.13
July 1, 1905, balance unexpended.....	821.66
July 1, 1905, outstanding liabilities.....	424.00
July 1, 1905, balance available.....	397.66

ALLOTMENTS.

September 19, 1900.....	\$1,460	July 14, 1903.....	\$2,300
January 18, 1901.....	1,500	June 25, 1904.....	700
May 24, 1901.....	23,200		
July 12, 1902.....	2,700	Total.....	31,860

COMMERCIAL STATISTICS.

Statement showing traffic through lock and dam in Yamhill River, Oregon, during fiscal year ending June 30, 1905.

Date.	Lock open.	Lock closed.	Number lockages.	Time operating.	Freight carried through lock.	Passengers carried.
1904.	Days.	Days.		h. m.	Tons.	
July.....	31	.....	2	0 25	276	4
August.....	31	.....	11	9 5	17	.....
September.....	30	.....	2	27	288	.....
October.....	31	.....	10	3 45	929	.....
November.....	25	5	24	9 29	535	.....
December.....	17	14	9	3 22	281	.....
1905.						
January.....	18	13	10	9 20	.....	.....
February.....	25	3	.....	.....	.....	.....
March.....	21	10	.....	.....	.....	.....
April.....	29	1	.....	.....	.....	.....
May.....	31	.....	2	28	.....	12
June.....	30	.....	53	37 51	1,783	28
Total.....	319	46	123	74 12	4,109	44

All freight carried has been practically cord wood for paper pulp and logs, with the exception of 17 tons of sand.

No regular steamers have operated above the lock.

Thirty lockages were made for towboats and the others for wood barges, rafts, fishing boats, and launches.

The relative location of the Yamhill River, the lock, dam, and adjacent points are shown on a map published in the Annual Report of the Chief of Engineers for 1903, page 2260.

V V 3.

IMPROVEMENT OF COLUMBIA AND LOWER WILLAMETTE RIVERS  
BELOW PORTLAND, OREGON.

For further information relative to the improvement of these streams, attention is invited to the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1905.

During the year the work of improvement consisted of deepening the channel by dredging, removing the old revetment at Coon Island and constructing a new revetment of stone on the adjacent bank of the island, and miscellaneous work connected with surveys, etc.

*Dredging.*—The U. S. dredge *Wm. S. Ladd* was in operation during the fiscal year with the exception of the period from January 11, 1905, to April 8, 1905, when she was laid up. During the year she worked on the several bars in the lower Columbia. Details of the work with

results are shown in Tables Nos. 1 and 2 accompanying this report. During the time she was laid up extensive repairs were made to her by the crew.

At the beginning of the present fiscal year funds were available from allotment of \$30,000 made on June 4, 1904, from emergency funds for dredging under contract with the port of Portland. With these funds the dredge *Columbia* was operated from August 1 to December 20 under contract dated June 17, 1904. The details are shown in Table No. 3 accompanying this report.

The port of Portland commission has operated its 20-inch Bowers dredge, the *Portland*, at different points in the lower Columbia and Willamette rivers, also its 30-inch Bowers dredge, the *Columbia*, when the latter was not employed by the United States or laid up, and reports excavation as follows:

Dredge <i>Portland</i> :		Cubic yards.
Morrison Street Bridge.....		13, 342
Harbor, below Steel Bridge .....		34, 388
Post-office bar.....		36, 162
Gillahans bar .....		16, 586
Mouth of the Willamette.....		86, 289
Slaughters .....		55, 393
		<u>242, 160</u>
Dredge <i>Columbia</i> :		
Harbor, below ferry crossing.....		22, 222
Swan Island, off University Bluff.....		60, 700
		<u>82, 922</u>
Total for both dredges .....		<u>325, 082</u>

TABLE 1.—Work done by dredge *Wm. S. Ladd* during fiscal year ending June 30, 1905.

Locality.	Periods at work, inclusive dates.	Days work- ing.	Time pump- ing.	Material moved.	Minimum depth.		Width of dredged cut.	Days re- pairing ma- chinery.
					Before.	After.		
			<i>h. m.</i>	<i>Cubic yards.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	
Cut at Taylor Sands...	July 1.....	1	5 25	3, 302. 90	.....	.....	.....	.....
Cut at Upper Sands...	July 2.....	1	5 40	8, 271. 87	.....	.....	.....	.....
Laid up for repairs....	July 3-Aug. 2 ..							
Cut at Martins .....	Aug. 3-Aug. 10..	6	28 10	10, 470. 50	17. 0	19. 0	.....	2
Cut at Harrington Point .....	Aug. 10-Aug. 31.	16	127 30	48, 380. 00	18. 5	20. 0	.....	.....
Do .....	Sept. 1-Sept. 30..	23	130 45	68, 148. 51	20. 0	21. 0	.....	.....
Do .....	Oct. 1-Oct. 31 ...	24	130 20	65, 687. 04	21. 0	22. 0	.....	.....
Cut at Pillar Rock bar .	Nov. 1-Nov. 30 ..	20	91 0	59, 845. 52	19. 0	20. 5	.....	3
Do .....	Dec. 1-Dec. 31...	25	111 20	72, 239. 81	20. 5	21. 5	.....	.....
Do .....	Jan. 1-Jan. 11 ...	8	38 15	24, 330. 40	21. 5	22. 0	.....	7
Laid up for repairs....	Jan. 12-Jan. 31 ..							
Do .....	Feb. 1-Feb. 28...							
Do .....	Mar. 1-Mar. 31 ...							
Cut at Upper Sands...	Apr. 8-Apr. 29....	19	89 20	21, 407. 00	19. 0	20. 0	.....	7
Cut at Taylor Sands...	May 1-May 31 ..	21	104 10	30, 739. 00	17. 0	18. 0	.....	.....
Cut at Upper Sands...				54, 612. 66	20. 0	21. 0	.....	.....
Cut at Taylor Sands...				.....	18. 0	22. 0	.....	.....
Cut at Pillar Rock bar .	June 1-June 30..	23	110 50	74, 485. 57	21. 0	21. 5	.....	.....
Total.....		187	972 45	536, 920. 28	.....	.....	.....	19

The following table shows the cost of this dredging, including the operating expenses, wages, subsistence, etc.:

TABLE 2.

Amount of material moved .....	cubic yards..	536,920
Operating expenses, wages, subsistence, current repairs, etc .....		\$19,758.15.
98 tons 50 pounds Franklin lump coal, at \$5.25 per ton....	\$514.51	
670 tons 800 pounds Roslyn lump coal, at \$5.62 per ton....	3,767.41	
15 tons 2,090 pounds Carbon Hill coal, at \$5.10 per ton....	81.28	
74 tons 1,334 pounds Roslyn lump coal, at \$5.30 per ton...	395.35	
79 tons 1,280 pounds U'Kay vein coal, at \$5.05 per ton....	401.83	
332 tons 1,840 pounds Roslyn lump coal, at \$5.05 per ton..	1,680.74	
		6,841.10
Total cost of operating.....		26,599.25
Cost per cubic yard for the fiscal year.....	cents..	4.9544
Cost per cubic yard for coal.....	do....	1.2741
Coal consumed per cubic yard.....	pounds..	5.3037
Cubic yards dredged per ton of coal.....		422
Cubic yards per day's dredging.....		2,855

The following is a statement of the total amount of material removed by the dredge since her construction in 1893:

	Cubic yards.
Total to close of fiscal year 1904 .....	5,178,864
Amount dredged during fiscal year 1905.....	536,920
Total .....	5,715,784

TABLE 3.—Work done by dredge Columbia during fiscal year ending June 30, 1905, under contract with port of Portland.

Locality.	Dates.	Days in operation.	Hours digging.	Length of cut.	Width of cut.	Average depth of cut.	Amount of material dredged.	Character of material.	Ruling depth after dredging.
				<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Cu. yards.</i>		<i>Feet.</i>
Reeders .....	Aug. 1-Aug. 9..	8.3	114.7	1,674	300	3.0	57,482	Sand and gravel.	25.5
Willow bar .....	{Aug. 9-Aug. 19.	11.8	212.5	3,890	300	2.0	85,167	Sand and silt.	24.5
	{Dec. 16-Dec. 20.								
Hunters .....	Aug. 19-Sept. 9.	16.6	324.1	5,516	300	3.0	171,457	Sand and gravel.	24.5
Slaughters bar....	Sept. 9-Oct. 26.	40.2	676.6	10,844	300	3.0	355,020	Sand, sticks, and clay.	24.0
Dobelbowers bar.	Oct. 26-Nov. 3.	6.3	128.0	2,450	300	2.0	49,424	Sand and gravel.	25.0
Upper Martins bar	Nov. 3-Nov. 22.	16.4	299.3	4,790	300	3.0	152,343	Sand and sticks.	24.5
Lower Martins bar	Nov. 22-Dec. 2.	7.9	168.3	3,050	300	2.5	89,229	Sand and gravel.	24.5
Henricis bar.....	Dec. 2-Dec. 16..	12.1	244.8	4,066	300	3.0	128,954	Sand .....	25.0
Total .....		119.6	2,168.3	36,280			1,089,076		

Cost of hire of dredge, including operating expenses, wages, subsistence, and repairs, at the contract price of \$235 per day, amounted to \$28,106.

Cost per cubic yard of material excavated, not including cost of inspection, 2.580 cents.

The cost of inspection was \$945.

U. S. dipper dredge *No. 1* was in operation at Coon Island from August 26, 1904, to November 14, 1904, engaged in removing the old revetment and in grading down the bank of Coon Island preparatory to its being revetted with stone.

One thousand one hundred and fourteen linear feet of the old revetment was partly removed to a depth of 13 feet at low water. One

thousand one hundred and eighty-six cubic yards of subaqueous rock was removed at a cost of \$2.17 per cubic yard.

In the grading of the bank the dredge removed 5,553 cubic yards of earth.

*New revetment at Coon Island.*—The bank of Coon Island for a distance of 900 feet was graded to a slope of 2 on 1 and revetted with stone extending from the top of the bank to a distance of 80 feet out from low-water line. The revetment varied in thickness from 2½ feet at toe of slope to 1 foot in thickness at top of bank and at outer edge.

The grading amounted to 6,124 cubic yards, and a total of 6,923 cubic yards of stone was placed.

*United States moorings.*—A considerable amount of work of maintenance of plant was done at the United States moorings, besides the building of two small flats, a pile driver, and a small quarter boat.

*Surveys.*—A survey was made of the reach of the Columbia River between Grims Island and Fisher Island, also numerous smaller surveys. The triangulation system of the Willamette River was connected with that of Willow bar reach and a number of new stations established on the latter. Low-water surveys were made at the different bars in the Columbia River.

*Fish traps and booms.*—A large amount of work was done in connection with fish traps and log booms. A total of 94 fish traps and 12 log booms were acted upon.

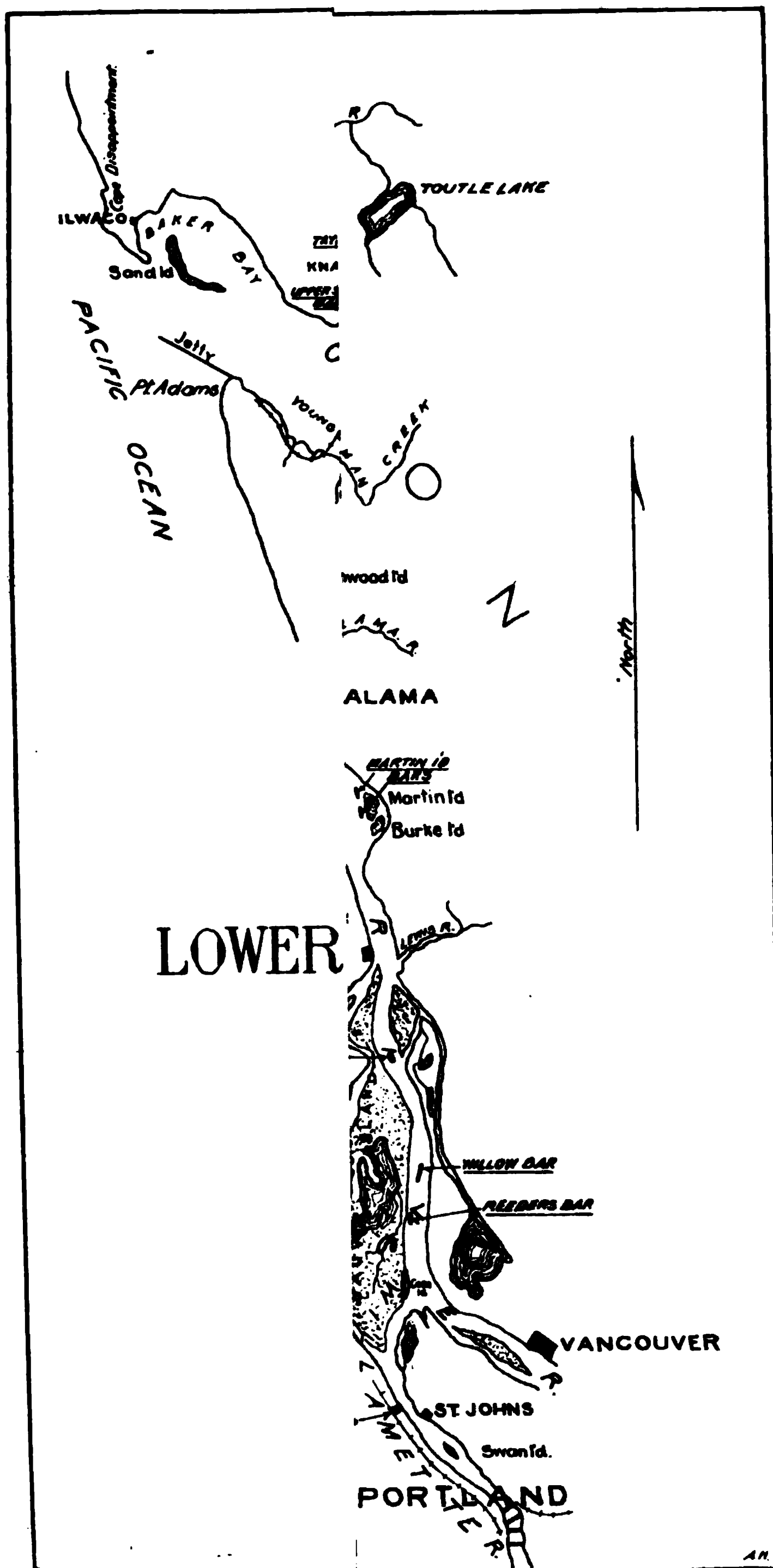
A project has been adopted and the work is now in progress with a view of obtaining a depth of 40 feet on the bar at the mouth of the Columbia River, and it would now seem that Congress should consider the improvement of the channel from Portland to the mouth of the river with a view to its improvement and betterment. The commerce of the river will naturally increase if the bar and river channels contemplated are secured and maintained, and the amount of commerce affected will certainly warrant the work necessary to secure a 25-foot channel over this stretch of river. The river is not now available for vessels of the larger draft to Portland, and on this account it is claimed that considerable transport and other business has been lost to this community.

The sum of \$500,000 is therefore named in the money statement for expenditure on works of permanent improvement in the fiscal year 1907, in addition to the balance available. The amount required for maintenance is \$125,000, which is needed principally for dredging and is essential for maintaining the present conditions.

The appropriation of these sums—a total of \$625,000—will enable the existing channels to be maintained and a beginning made on some of the permanent works of improvement included in the project. The funds for maintenance are essential in any event and will have to be expended from any funds made available for the work. The full sum of \$625,000 should therefore be appropriated without reduction, which, with the balance on hand, is to be applied to work under the approved project.

As the funds expended during the fiscal year were for maintenance and repairs and as the amounts now available are sufficient only for dredging to maintain the channel, it may be said that nothing was expended on the project for improvement, and on that account no change has been made over the figures given last year as the amount required for completion of the existing project.





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This work is in charge of Mr. Gerald Bagnall, assistant engineer.

*Money statement.*

July 1, 1904, balance unexpended .....	\$95,557.54
Amount appropriated by river and harbor act approved March 3, 1905.	100,000.00
Deposited account proceeds Government property .....	56.00
	<hr/>
	195,613.54
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	89,395.44
	<hr/>
July 1, 1905, balance unexpended .....	106,218.10
July 1, 1905, outstanding liabilities .....	4,951.00
	<hr/>
July 1, 1905, balance available .....	101,267.10
	<hr/>
Amount (estimated) required for completion of existing project .....	2,673,509.93
	<hr/>
Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement.....	\$500,000.00
For maintenance of improvement.....	125,000.00
	<hr/>
	625,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

Lower Willamette:	
June 23, 1866 .....	\$15,000.00
March 2, 1867 .....	30,000.00
July 25, 1868 (allotted) .....	21,000.00
April 10, 1869 (allotted) .....	13,365.00
July 11, 1870 .....	31,000.00
June 10, 1872 .....	50,000.00
	<hr/>
	\$160,365.00
Lower Willamette, from Portland to the sea:	
March 3, 1873 .....	20,000.00
June 23, 1874 .....	20,000.00
March 3, 1875 .....	20,000.00
August 14, 1876 .....	20,000.00
June 18, 1878 .....	30,000.00
March 3, 1879 .....	45,000.00
	<hr/>
	155,000.00
Lower Willamette and Columbia, from Portland to the sea, including bar at the mouth of Columbia:	
June 14, 1880 .....	45,000.00
March 3, 1881 .....	45,000.00
August 2, 1882 .....	100,000.00
	<hr/>
	190,000.00
Columbia and Lower Willamette, below Portland, Oreg.:	
July 5, 1884 .....	100,000.00
August 5, 1886 .....	75,000.00
August 11, 1888 .....	100,000.00
September 19, 1890 .....	100,000.00
July 13, 1892 .....	150,000.00
August 18, 1894 .....	50,000.00
June 3, 1896 .....	100,000.00
March 3, 1899 .....	150,000.00
June 13, 1902 .....	225,000.00
April 28, 1904 (allotted) .....	15,000.00
March 3, 1905 .....	100,000.00
	<hr/>
	1,165,000.00
June, 1899, deposited to credit of appropriation .....	.20
May, 1901, deposited to credit of appropriation .....	1.56

# 2480 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

December 3, 1902, deposited to credit of appropriation, account sales..	\$46. 77
August 17, 1903, deposited to credit of appropriation, account sales....	51. 00
Treasury settlement, Major Post, October, 1897 (\$30); deposited February, 1887, Colonel Jones, account overpayment (\$4.35) .....	34. 35
August 24, 1904, deposited to credit of appropriation, account sales....	56. 00
Total .....	1, 670, 554. 88

## CONTRACTS IN FORCE.

### Emergency:<sup>a</sup>

Name of contractor: George W. Sanborn, Astoria, Oreg.

Date of contract: January 4, 1904.

Character: Furnishing and delivering coal.

Quantity: Indefinite. (Approximate delivery, 12,000 tons.)

Prices, per ton of 2,240 pounds:

\$5.45 for Roslyn mine run delivered at Astoria, Oreg.

5.45 for Roslyn mine run delivered at Kalama, Wash.

5.30 for Roslyn mine run delivered at Fort Stevens, Oreg.

5.65 for Roslyn lump delivered at Astoria, Oreg.

5.65 for Roslyn lump delivered at Kalama, Wash.

5.50 for Roslyn lump delivered at Fort Stevens, Oreg.

5.75 for Franklin mine run delivered at Astoria, Oreg.

5.75 for South Prairie mine run delivered at Astoria, Oreg.

5.75 for South Prairie mine run delivered at Kalama, Wash.

5.75 for South Prairie mine run delivered at Fort Stevens, Oreg.

Approval: Contract authorized by Chief of Engineers December 18, 1903.

Date of beginning: Whenever required after date of contract.

Date of expiration: December 31, 1904.

### Emergency:<sup>a</sup>

Name of contractor: Astoria Iron Works, Astoria, Oreg.

Date of contract: January 18, 1904.

Character of work: Replacing steam boiler on tugboat.

Amount of work: One boiler.

Price: \$4,560 for the whole work.

Approval: Not required.

Dates of beginning and expiration: To be completed within one hundred and twenty days from date of contract.

Extension: Date of expiration extended a reasonable time.

Completed: April, 1905.

### Formal:

Name of contractor: The Port of Portland, Portland, Oreg.

Date of contract: June 17, 1904.

Nature of contract: Hire of dredges.

Character of work: Dredging.

Amount of work: Indefinite.

Prices:

\$155 per day for use of 20-inch dredge.

235 per day for use of 30-inch dredge.

Approved: July 11, 1904.

Date of beginning: July 1, 1904.

Date of expiration: June 30, 1906. (In force June 30, 1905.)

### Emergency:<sup>a</sup>

Name of contractor: George W. Sanborn, Astoria, Oreg.

Date of contract: January 31, 1905.

Character: Furnishing and delivering coal.

Quantity: Indefinite. (Approximate delivery, 5,000 tons.)

Prices, per ton of 2,240 pounds:

\$5.05 for Ravensdale new-vein mine run delivered at Astoria, Oreg.

5.05 for Ravensdale new-vein mine run delivered at Kalama, Wash.

5.30 for Roslyn lump delivered at Fort Stevens, Oreg.

Approval: Contract authorized by Chief of Engineers December 10, 1904.

Date of beginning: Whenever required after date of contract.

Date of expiration: December 31, 1905. (In force June 30, 1905.)

"This contract is also shown in report for "improving mouth of Columbia River, Oregon and Washington."

## COMMERCIAL STATISTICS.

*Arrivals and clearances of vessels at Astoria, Oreg., during the year ending December 31, 1904.*

[From collector of customs at Astoria, Oreg.]

Vessels.	Coastwise.		Foreign ports.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Arrived .....	921	1,012,694	58	107,962	974	1,120,656
Cleared .....	891	965,406	2	1,046	893	966,452
Total .....	1,812	1,978,100	55	109,008	1,867	2,097,108

*Commerce for the year ending December 31, 1904.*

Value of exports .....	\$9,100.00
Value of imports .....	38,692.00
Duties collected .....	7,479.64

Principal items of export are lumber and salmon.

Principal items of import are coal, pig tin, diamonds, Chinese merchandise, and Japanese merchandise.

*Arrivals and clearances of vessels at Portland, Oreg., during the year ending December 31, 1904.*

[From collector of customs at Portland, Oreg.]

Vessels.	Coastwise.		Foreign ports.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Arrived .....	874	847,751	33	66,661	407	414,412
Cleared .....	811	251,297	83	157,580	394	408,877
Total .....	685	599,048	116	224,241	801	823,289

*Commerce for the year ending December 31, 1904.*

Value of exports .....	\$7,113,312
Value of imports .....	2,647,503
Duties collected .....	675,174

*Registered tonnage over Columbia River bar, calendar year 1904.*

	Deep-sea vessels.						Coasters.		Total.	
	American.		British.		Other flags.					
	Num-ber.	Ton-nage.	Num-ber.	Ton-nage.	Num-ber.	Ton-nage.	Num-ber.	Ton-nage.	Num-ber.	Tonnage.
Inward to Astoria and Portland .....	11	7,588	31	68,563	37	82,315	497	414,806	576	573,272
Outward from Portland and Astoria .....	24	25,068	32	71,395	32	69,413	484	393,793	572	559,669
Total .....	35	32,656	63	139,958	69	151,728	981	808,599	1,148	1,132,941

Total freight, foreign and coastwise, carried in and out over the Columbia River bar during the calendar year 1904, 778,328 tons.

2482. REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

*Statement showing principal articles and tonnage of foreign exports and imports at Portland, Oreg., during the calendar year 1904.*

EXPORTED.

Articles.	Tons.	Articles.	Tons.
Wheat .....	81,296	Hay .....	2
Flour .....	73,015	Cloth .....	62
Barley .....	23,987	Wire .....	227
Timber .....	58,289	Tobacco .....	335
Canned salmon .....	100	Other articles .....	3,088
Cotton .....	1,372		
Canned beef .....	16	Total .....	241,726
Oats .....	7		

IMPORTED.

Coal .....	15,283	Window glass .....	887
Manila, jute, etc .....	1,655	Pig and bar iron .....	14,761
Sulphur .....	8,398	Spirits .....	75
Bags .....	1,312	Matting .....	1,544
Rice .....	2,050	Clay and brick .....	4,110
Sugar .....	678	Coke .....	6,084
Tea .....	661	Articles in bond .....	46,925
Coffee .....	128		
Salt .....	280	Total .....	134,218
Cement .....	84,437		

The following statement of traffic on the Columbia and lower Willamette rivers has been compiled from reports of the various steamers and transportation companies doing business on these rivers during the calendar year 1904:

Articles.	Tons.	Articles.	Tons.
Wheat .....	19,664	Iron .....	270
Other cereals .....	12,030	Shingles .....	6,612
Flour and feed .....	32,604	Piles (2,732,000 linear feet) .....	54,640
Potatoes .....	22,624	Lumber (19,966,802 feet B. M.) .....	25,957
Fruit .....	4,314	Logs (525,918,625 feet B. M.) .....	1,051,837
Fish .....	24,609	Sand and gravel .....	210,791
Hops .....	74	Stone .....	186,571
Hay .....	9,645	Brick .....	475
Wool .....	338		
General merchandise .....	185,442	Handled by river vessels .....	1,905,451
Wood (32,402 cords) .....	48,603	Handled by seagoing vessels .....	778,328
Coal .....	1,387		
Cattle and horses (number 13,205) .....	5,282	Total .....	2,683,779
Sheep and hogs (number 22,420) .....	1,682		

Passengers carried by river vessels, 285,182.

*List of vessels, 15 tons and over (not including seagoing vessels), plying the Willamette and lower Columbia rivers and their tributaries, between Portland and Astoria, Oreg.; the upper Willamette and Yamhill rivers and their tributaries, above Portland, Oreg., during the calendar year 1904.*

[Furnished by the inspectors of boilers and hulls at Portland, Oreg.]

Name of vessel.	Net tonnage.	Depth.	Name of vessel.	Net tonnage.	Depth.
		<i>Feet.</i>			<i>Feet.</i>
Albany .....	401	4.5	Leona .....	133	4.0
Altona .....	242	4.8	Lionel R. Webster .....	261	8.3
America .....	67	6.2	Lizzie .....	31	6.4
Annie Comings .....	431	5.6	Lottie .....		
Astorian .....	234	7.5	Lurline .....	338	6.6
Bailey Gatzert .....	444	8.0	Mathloma .....	270	4.0
Canby .....	49	5.4	Maria .....	184	5.9
Cascades .....	267	5.6	Mayflower .....	82	6.0
Cash .....	24	4.6	M. F. Henderson .....	315	7.5
Charles R. Spencer .....	409	6.0	Mascot .....	199	5.5
Chester .....	98	3.8	Melville .....	64	6.9
City of Eugene .....	214	4.5	Metlako .....	122	4.8
Dalles City .....	323	8.2	Modoc .....	354	4.8
Eclipse .....	25	5.6	N. B. Lang .....	381	6.2
Edith .....	37	9.3	Nahcotta .....	112	6.5
Electro .....	30	5.3	Nellie .....	59	4.2
El Hurd .....	26	6.2	Nestor .....	31	5.0
Elkkader .....	21	4.0	Norman .....	28	5.6
Elmore .....	467	4.5	Northwest .....	301	4.8
Enterprise .....	209	4.5	No Wonder .....	235	5.6
Eugene .....	250	6.6	Ocklahoma .....	565	8.3
F. B. Jones .....	193	7.0	O. K. ....	47	5.2
Fannie .....	276	6.6	Oregona .....	281	5.0
Florence .....			Paloma .....	112	5.4
Flyer .....	258	15.0	Pomona .....	296	6.1
Geo. H. Mendell .....	90	7.0	Regulator .....	308	7.7
Geo. H. Williams .....	98	7.8	Republic .....	60	5.0
G. M. Walker .....	125	4.2	R. Miller .....	56	6.8
Glenola .....	276	5.4	Resolute .....		5.0
Game Cock .....	658	7.9	Robert T. Lincoln .....	50	7.0
Grey Eagle .....	162	4.7	Ruth .....	388	4.6
Harvest Queen .....	430	9.0	Sarah Dixon .....	278	6.0
Hassalo .....	428	8.4	Stranger .....	51	6.0
Hercules .....	293	8.6	Tacoma .....	1,131	11.7
Hoo-Hoo .....	16	3.2	Tahoma .....	154	6.0
Hustler .....	129	7.0	T. J. Potter .....	533	11.4
Ione .....	213	5.0	Undine .....	280	6.6
Iralda .....	59	3.7	Vanguard .....	51	4.8
James B. Stephens .....	16	3.0	Victor .....	27	5.7
Jessie Harkins .....	55	4.2	Volga .....	48	4.0
John McCracken .....	52	8.4	Vulcan .....	219	7.0
John F. Caples .....	157	7.0	Wenona .....	34	6.2
Jordan .....	61	6.2	W. S. Mason .....	252	7.4
Joseph Kellogg .....	342	7.2	Wm. S. Ladd .....	700	12.0
Kehani .....	85	6.0			

#### V V 4.

#### IMPROVEMENT OF COLUMBIA RIVER BELOW TONGUE POINT, OREGON.

For details of this work, with status of improvement, see summary of this report.

#### OPERATIONS DURING THE FISCAL YEAR 1905.

No work was done during the fiscal year 1905 on any portion of this work. The amount expended was on account of care of property and fitting up of new mooring grounds on the Willamette River, opposite St. Johns, Oreg., about 6 miles below Portland, Oreg.

It is expected that the balance available for this work will be expended in dredging for deepening the channel below and along the water front of Astoria.



# 2484 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

## *Money statement.*

July 1, 1904, balance unexpended .....	\$24,588.75
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	331.37
July 1, 1905, balance unexpended .....	24,257.38

## APPROPRIATIONS.

June 3, 1896, from unexpended balance to the credit of improving mouth of Columbia River, Oregon and Washington .....	\$50,000
Act of March 3, 1899 .....	71,000
Total .....	121,000

## COMMERCIAL STATISTICS.

The tonnage for these waters is shown in the report for "Improving Columbia and Lower Willamette rivers below Portland," but the conditions are changed from what they were at the time of the adoption of the project, inasmuch as the commerce for this portion of the river does not now include the through shipping carried by the ocean-going craft and which consist principally of wheat and lumber exports.

## V V 5.

### IMPROVEMENT OF THE MOUTH OF COLUMBIA RIVER, OREGON AND WASHINGTON.

For extended information and full details, maps and charts of the proposed improvement, with estimate of cost, attention is invited to Annual Report of the Chief of Engineers for 1903, pages 2275 et seq., and to the summary of this report.

#### OPERATIONS DURING THE FISCAL YEAR 1905.

At the beginning of the fiscal year the jetty tracks were being repaired, and at that time this work had advanced to station 292+26, a distance of 29,226 feet from shore, or 4,210 feet beyond the end of the original jetty. During the season of 1904 the work was being prosecuted with a view to an extension of the jetty as far seaward as could be thoroughly enrocked and protected. In July and August the jetty tracks were extended a distance of 3,366 feet, or to station 325+84, making the total length of extension beyond the end of the old jetty 7,576 feet. The outer seven bents of the tramway were widened to 36 feet and straightened at each bent by having 6 instead of 4 piles. Batter piles were also driven at various places, and anchor piles placed having cables stretched to the trestle as guys for strengthening the latter.

On October 10, during a severe gale, all portions of the jetty tramway between stations 216+30 and 227+74, built in 1901, and between stations 247+02 and 256+18, built in 1903, were carried away, the total length being about 2,000 feet.

An examination of the piles of the portion of the jetty tracks mentioned above and which was built during previous seasons, showed that all the piles were eaten by the teredo, the majority badly, so that the destruction of the track was not due to structural weakness, while the presence of the teredo was entirely unexpected.

Before commencing the work of redriving the piles of the washed-out tracks an examination was made of the standing end of the old track, and it was found that from station 209+68 to station 216+70, a distance of 702 feet, the teredo had gotten a good start. This point was the last standing bent of the old work. These bents were consequently strengthened by having two new outside piles driven. On account of stormy weather little track work was done until December except repairing and strengthening the old track.

During December 20 bents were put in from station 214+20 to station 216+80 on a loop turning from the main track at station 214+20 toward the north.

On December 29, 1904, during a storm which had lasted several days, all the remaining tracks which had been constructed beyond station 216+80 were destroyed with the exception of about 2,400 feet at the outer end. An examination of the washed-out piles of this outer end showed that out of 125 piles only 3 were affected by the teredo. Two hundred feet of the old track, station 212 to station 214, was also destroyed, leaving the newly constructed portion of the loop, station 214+20 to station 216+80, standing detached.

On January 4 the redriving of the tracks was again started and a new loop towards the north commenced at station 210+35 of the old jetty tracks. During the month 52 bents were driven, which brought the track to station 219+90, or 21,990 feet from shore. The detached section of track beyond station 212, consisting of about 18 bents, was gradually washed out or removed when opportunity offered.

The active work of repairing the damage caused by the winter storms was commenced as early as the weather conditions would permit, and in March Station 225+50 had been reached, and on account of injury to the trestle while crossing a deep hole, was suspended. On examination of the ground it was decided to change the location of the loop, and a fresh start was made from station 214+68 and a more northerly course followed in order to avoid the deeper water. The abandoned portion of the loop beyond this point was removed, and beginning at this point on the new loop all piles used have been treated with a covering of burlap and coal tar as a protection against the action of teredo.

At the end of the fiscal year 1905 the tracks have been rebuilt from station 210+35 of the original jetty to station 279+22 on the line of the partly-constructed jetty of 1903-4. These tracks, after leaving the original jetty, form a loop to the northwest, then turn southerly and connect the end of the original jetty with the inner end of the submerged enrockment of the jetty extension of 1903-4 at station 255+46 on the latter, which it crosses and then turns again to a line parallel with it at a distance of about 35 feet to the south. By this means the stone placed during 1903-4 will be utilized as part of the jetty when it shall have been built up to the required height, and driving through the enrockment avoided.

It had been intended to go out on the north side of the submerged enrockment of 1903-4, but examination of the ground showed that

while there was a filling up of sand on the south side, the north side was paralleled by a deep trench which would have increased the amount of rock required considerably. Much difficulty was experienced in building the tracks on the loop on account of the rapid scour of the bottom after the piles had been driven, this reached as much as 15 feet between the time of driving the piles and placing rock. It was found necessary to carry the rock to a level of 25 feet below low water in order to steady the track.

At the beginning of the present fiscal year two short sections of the old damaged tramway, about 612 and 396 feet long, respectively, remained, and several hundred feet of the standing end of that portion driven during the season of 1904 had also been destroyed.

Under contracts in force at the beginning of the fiscal year with the Northwest Construction Company, of Astoria, Oreg., and the Columbia Contract Company, of Portland, Oreg., stone was being received at an approximate daily rate of 2,300 tons, and was continued until work was suspended on account of the damage to the jetty tramway. Under the former-mentioned contract 73,312 tons were received, and under the latter 128,705.3 tons were received. These contracts were then closed and final payment made, including the retained percentage.

New proposals were issued in January, 1905, for furnishing stone during the season, in anticipation of the passage of the river and harbor bill, and resulted in the making of two contracts following the passage of the river and harbor act of March 3, 1905, which appropriated \$400,000 for continuing the work and authorized contracts not exceeding \$300,000 in the aggregate. These two contracts are dated April 10, 1905, one with J. W. Sweeney, of Portland, Oreg., for furnishing 110,000 tons, at \$1.02 per ton, and the other with the Columbia Contract Company, of Portland, Oreg., for furnishing 450,000 tons, at \$1.10 per ton. Up to the end of the fiscal year 19,759 tons had been received under the former and 92,874 tons had been received under the latter contract.

A small emergency contract was also made, under date of March 17, 1905, for furnishing 10,000 tons, more or less, of riprap stone for use in protecting around the piles of the loop. The contract price for this stone was \$1.07 per ton, and the total quantity received was 10,355.6 tons.

On the suspension of the work of extension in October, 1904, the height of the enrockment over this portion was as follows: Bent 1507, station 255+64, to bent 1758, station 300+82, a distance of 4,518 feet, the enrockment reached to within about 18 feet below low water, and from the latter station to the outer end of the extension, a distance of 1,116 feet, it reached to within about 10 feet below low water.

At the end of the fiscal year the enrockment of the jetty extension reached to within the depths below low water as follows:

	Feet.
Stations 248+98 to 275+98.....	13
Stations 275+98 to 315+04.....	18
Stations 315+04 to 325+30.....	10
Stations 325+30 to 327+64.....	15

The total length of jetty tramway constructed during the fiscal year was 12,143 linear feet. The total length of jetty tramway destroyed was about 8,275 linear feet. The total amount of stone placed on the jetty during the fiscal year was 325,007 tons.

The U. S. dredge *Chinook* operated on the bar from the beginning of the fiscal year up to the end of November, when operations were suspended, owing to the approach of the winter season and in order to make repairs to her boilers and machinery.

The following table shows the details of work done and cost thereof:

Number of days in commission.....	153
Number of days dredging.....	71
Cubic yards of material moved.....	245,220
Number of drags across bar.....	463
Actual time pumping.....hours..	279 $\frac{1}{2}$
Time dumping and returning.....do....	146
Length of cuts (aggregate).....feet..	17,300

The cost of operation is as follows for the same period:

Fuel consumed, cost of.....	\$19,339.00
Pay rolls.....	19,778.20
Subsistence.....	4,114.78
Deck and engine-room supplies.....	2,800.00
Total cost of operating.....	46,031.98
Cost per cubic yard of sand moved.....	.1877

As the result of bids opened on January 3, 1905, a contract was made under date of January 17, 1905, with the Risdon Iron and Locomotive Works, of San Francisco, Cal., for making repairs to the dredge. The dredge proceeded to San Francisco on January 21, the repairs were completed in accordance with the contract, and she again arrived at the mouth of the Columbia River on April 14. The crew was paid off at the end of April, since which time she has been laid up at the Government moorings below Portland, Oreg.

The repairs to the rolling stock and plant pertaining to this work have been made by the United States in the shops maintained at Fort Stevens for that purpose. All the forgings and bolts, besides the forgings for construction of new dump cars, have been made in these shops. Twenty new geared dump cars were constructed during the year, and twenty more are now under construction.

A block system has also been installed, consisting of six blocks operated by telephones installed in booths along the tramway. This has operated in a very satisfactory manner, especially during foggy weather, in the handling of rock trains, and has greatly lessened the danger of accidents.

The old receiving wharf was repaired during the year, the tracks and approaches rearranged, and the old stone yard used the previous season for receipt of stone by rail abandoned, the plant removed and installed for the receipt of rock by water under the two contracts. The work is laid out and planned so that it is possible to receive about 3,000 tons per day.

A survey of Sand Island was made and eight concrete monuments were placed on the line of the island about one-half mile apart and located.

In June, 1905, a retriangulation of the principal stations used in connection with the jetty construction was made. A survey of the bar was also made. This survey shows, so far as can be told, some deepening over the survey of June, 1904, but the amount, for reasons given below as to datum of the lower low water, on the bar is uncertain. This deepening is confirmed by the variations in depth at various places on the bar, which would indicate that scouring action is going on.

The mean of lower low waters on the bar is probably on a lower plane than the plane of the lower low waters at Fort Stevens wharf, but sufficient observations have not been taken to determine the correction which should be applied to the depths which have been reduced by readings of a gauge on the jetty at station 265+72, the zero of which is in the same plane as the zero of the gauge at Fort Stevens wharf.

A map showing the soundings taken on this survey is transmitted herewith.

Prospecting for stone was carried on at several localities during the year with a view to finding suitable stone for jetty construction, but at the close of the year a quarry that would furnish stone of the required quality and quantity had not been discovered.

This work was in local charge of Mr. G. B. Hegardt, assistant engineer, to May 30, 1905, since which date it has been in charge of Mr. Gerald Bagnall, assistant engineer, who is also in charge of other works.

*Money statement.*

July 1, 1904, balance unexpended .....	\$756, 791. 36
Amount appropriated by river and harbor act approved March 3, 1905. ....	400, 000. 00
	<u>1, 156, 791. 36</u>
June 30, 1905, amount expended during fiscal year, for works of improvement.....	706, 847. 17
	<u>449, 944. 19</u>
July 1, 1905, balance unexpended .....	112, 200. 00
July 1, 1905, outstanding liabilities .....	<u>337, 744. 19</u>
July 1, 1905, balance available .....	<u>484, 883. 00</u>
July 1, 1905, amount covered by uncompleted contracts.....	1, 815, 000. 00
Amount (estimated) required for completion of existing project .....	<u>1, 150, 000. 00</u>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	
Submitted in compliance with requirements of sundry civil act of June 4, 1897. ....	

APPROPRIATIONS.

July 5, 1884.....	\$100, 000. 00
August 5, 1886 .....	187, 500. 00
August 11, 1888 .....	500, 000. 00
February 22, 1890 .....	75, 000. 00
September 19, 1890 .....	475, 000. 00
July 13, 1892.....	350, 000. 00
August 18, 1894.....	338, 180. 00
	<u>2, 025, 680. 00</u>
June 3, 1896, transferred to credit of improvement of Columbia River below Tongue Point.....	50, 000. 00
	<u>1, 975, 680. 00</u>
June 6, 1900 (sundry civil act) .....	250, 000. 00
November, 1900, deposited to credit of appropriation .....	2. 00
June 13, 1902.....	500, 000. 00
December 3, 1902, deposited to credit of appropriation, account sales ..	56. 31
March 3, 1903 (sundry civil act).....	1, 000, 000. 00
Deposited to credit of appropriation account of proceeds of Government property and settlement of accounts of Maj. Jas. C. Post .....	7. 50
March 3, 1905 .....	400, 000. 00
	<u>4, 125, 745. 81</u>
Total .....	4, 125, 745. 81

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## CONTRACTS IN FORCE.

## Formal:

Name of contractor: Northwest Construction Company, Astoria, Oreg .  
 Date of contract: May 27, 1903.  
 Character: Furnishing and delivering stone.  
 Quantity: 475,000 tons.  
 Price: 91 cents per ton of 2,000 pounds.  
 Approved: July 2, 1903.  
 Date of beginning: October 10, 1903. (Extended indefinitely.)  
 Date of expiration: March 1, 1905.  
 Supplement to above contract, dated January 21, 1904, reduces the quantity of stone to be delivered by the contractor from 475,000 tons to 200,000 tons, and provides for the purchase by the United States of the car bodies constructed by the contractor.  
 Supplemental contract approved February 3, 1904.  
 Deliveries under supplemental contract began April 21, 1904.  
 Second supplement to above contract, dated June 29, 1904, reduces the quantity of stone to be delivered by the contractor from 200,000 tons to 150,000 tons.  
 Second supplemental contract approved July 12, 1904.  
 Total quantity delivered: 118,558 tons.  
 Contract terminated October 10, 1904. The washing away of portion of the jetty tramway made suspension of operations necessary.  
 Third supplement to above contract, dated February 6, 1905, providing for payment for 275 car bodies constructed by contractor.  
 Prices:  
     175 large car bodies at \$31.50 each.  
     100 small car bodies at \$21.50 each.  
 Third supplemental contract approved March 1, 1905.

Emergency:<sup>a</sup>

Name of contractor: Geo. W. Sanborn, Astoria, Oreg.  
 Date of contract: January 4, 1904.  
 Character: Furnishing and delivering coal.  
 Quantity: Indefinite. (Approximate delivery, 12,000 tons.)  
 Prices per ton of 2,240 pounds:  
     \$5.45 for Roslyn mine-run delivered at Astoria, Oreg.  
     5.45 for Roslyn mine-run delivered at Kalama, Wash.  
     5.30 for Roslyn mine-run delivered at Fort Stevens, Oreg.  
     5.65 for Roslyn lump delivered at Astoria, Oreg.  
     5.65 for Roslyn lump delivered at Kalama, Wash.  
     5.50 for Roslyn lump delivered at Fort Stevens, Oreg.  
     5.75 for Franklin mine-run delivered at Astoria, Oreg.  
     5.75 for South Prairie mine-run delivered at Astoria, Oreg.  
     5.75 for South Prairie mine-run delivered at Kalama, Wash.  
     5.75 for South Prairie mine-run delivered at Fort Stevens, Oreg.  
 Approval: Contract authorized by Chief of Engineers December 18, 1903.  
 Date of beginning: Whenever required after date of contract.  
 Date of expiration: December 31, 1904.

Emergency:<sup>a</sup>

Name of contractor: Astoria Iron Works, Astoria, Oreg.  
 Date of contract: January 18, 1904.  
 Character of work: Replacing steam boiler on tugboat.  
 Amount of work: One boiler.  
 Price: \$4,560 for the whole work.  
 Approval: Not required.  
 Dates of beginning and expiration: To be completed within one hundred and twenty days from date of contract.  
 Extension: Date of expiration extended a reasonable time.  
 Completed: April, 1905.

## Emergency:

Name of contractor: Gorman & Brewster, Stella, Wash.  
 Date of contract, March 15, 1904.  
 Character: Furnishing and delivering piles.  
 Quantity: 104,375 linear feet.  
 Price: 10½ cents per linear foot.

<sup>a</sup> This contract is also shown in report for "Improving Columbia and lower Willamette rivers, below Portland, Oreg."

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Emergency—Continued.

Approval: Contract authorized by Chief of Engineers February 27, 1904.

Date of beginning: June 1, 1904.

Date of expiration: August 1, 1904.

Completed: July 20, 1904.

Formal:

Name of contractor: Columbia Contract Company, Portland, Oreg.

Date of contract: March 30, 1904.

Character: Furnishing and delivering stone.

Quantity: 240,000 tons, more or less.

Price: \$1.08 per ton of 2,000 pounds.

Approved: April 14, 1904.

Date of beginning: About April 30, 1904.

Date of expiration: Eight months from date of beginning.

Supplement to above contract, dated November 7, 1904, providing for the termination of the contract.

Supplemental contract approved November 28, 1904.

Quantity delivered under contract of March 30, 1904: 170,303 tons.

Emergency:

Name of contractor: Illinois Steel Company, Chicago, Ill.

Date of contract: November 4, 1904.

Character: Furnishing and delivering rails, etc.

Quantities and prices:

110 tons steel rails, 40 pounds, at \$34.59 per ton of 2,240 pounds.

8,600 pounds spikes,  $\frac{1}{2}$  inch by  $4\frac{1}{2}$  inches, at \$2.17 per hundredweight.

Approval: Not required.

Dates of beginning and expiration: All articles to be shipped from mill within seven days from date of contract.

Completed: Articles received November 30, 1904.

Emergency:

Name of contractor: J. W. Shafford, Portland, Oreg.

Date of contract: November 9, 1904.

Character: Furnishing and delivering piles.

Quantities and prices: 40,550 linear feet at  $9\frac{1}{4}$  cents per linear foot; 18,900 linear feet at  $10\frac{1}{4}$  cents per linear foot; 18,000 linear feet at  $10\frac{1}{4}$  cents per linear foot.

Approval: Contract authorized by Chief of Engineers November 2, 1904.

Date of beginning: Delivery to commence within thirty days after date of contract.

Date of expiration: January 1, 1905.

Completed: December 31, 1904.

Emergency:

Name of contractor: Eastern and Western Lumber Company, Portland, Oreg.

Date of contract: November 10, 1904.

Character: Furnishing and delivering lumber.

Quantity: 410,250 feet B. M.

Price: Average, \$10.43 per 1,000 feet B. M.

Approval: Not required.

Dates of beginning and expiration: All lumber to be delivered within thirty days after date of contract.

Extension: Time for completion of contract extended a reasonable period.

Completed: January 5, 1905.

Emergency:

Name of contractor: Union Iron Works, San Francisco, Cal.

Date of contract: January 10, 1905.

Character of work: Furnishing and delivering steam windlass.

Amount of work: One windlass.

Price: \$3,400.

Approval: Contract authorized by Chief of Engineers May 19, 1904.

Dates of beginning and expiration: To be delivered within thirty days after January 23, 1905, date of arrival of U. S. dredge *Chinook* at San Francisco, Cal.

Completed: February 10, 1905.

Emergency:

Name of contractor: Risdon Iron and Locomotive Works, San Francisco, Cal.

Date of contract: January 10, 1905.

Character of work: Repairs to dredge *Chinook*.

Amount of work: Indefinite.

Price: \$20,710 for the whole work.

**Emergency—Continued.**

Approval: Contract authorized by Chief of Engineers December 10, 1904, and January 9, 1905.

Dates of beginning and expiration: Work to be completed within forty-five days after January 22, 1905, date of arrival of U. S. dredge *Chinook* at San Francisco, Cal.

Supplement to above contract, dated March 6, 1905, provides for certain changes in repairs to U. S. dredge *Chinook* and reduces price for the whole work \$735.

Supplemental contract approved March 25, 1905.

Work completed April 1, 1905.

**Emergency: <sup>a</sup>**

Name of contractor: George W. Sanborn, Astoria, Oreg.

Date of contract: January 31, 1905.

Character: Furnishing and delivering coal.

Quantity: Indefinite. (Approximate delivery 5,000 tons.)

Prices, per ton of 2,240 pounds:

\$5.05 for Ravensdale new vein mine-run delivered at Astoria, Oreg.

\$5.05 for Ravensdale new vein mine-run delivered at Kalama, Wash.

\$5.30 for Roslyn lump delivered at Fort Stevens, Oreg.

Approval: Contract authorized by Chief of Engineers December 10, 1904.

Date of beginning: Whenever required after date of contract.

Date of expiration: December 31, 1905. (In force June 30, 1905.)

**Emergency:**

Name of contractor: W. H. Cole, Portland, Oreg.

Date of contract: March 17, 1905.

Character: Furnishing and delivering stone.

Quantity: 10,000 tons, more or less.

Price: \$1.07 per ton of 2,000 pounds.

Approval: Contract authorized by Chief of Engineers March 13, 1905.

Date of beginning: Within ten days from date of contract.

Date of expiration: Contingent on progress of jetty tramway construction.

Completed: May 16, 1905.

**Emergency:**

Name of contractor: Gorman & Brewster, Portland, Oreg.

Date of contract: March 22, 1905.

Character: Furnishing and delivering piles.

Quantity: 120,900 linear feet.

Price: 10½ cents per linear foot.

Approval: Contract authorized by Chief of Engineers March 13, 1905.

Date of beginning: April 25, 1905.

Date of expiration: July 15, 1905.

Completed: June 30, 1905.

**Emergency:**

Name of contractor: City Lumber and Box Company, Astoria, Oreg.

Date of contract: March 23, 1905.

Character: Furnishing and delivering lumber.

Quantity: 688,325 feet B. M.

Price: \$10.50 per 1,000 feet B. M.

Approval: Contract authorized by Chief of Engineers March 13, 1905.

Date of beginning: On or before April 25, 1905.

Date of expiration: On or before June 15, 1905.

Completed: June 14, 1905.

**Emergency:**

Name of contractor: W. D. Hofius & Co., Seattle, Wash.

Date of contract: March 24, 1905.

Character: Furnishing and delivering rails, etc.

Quantities and prices: 150 tons steel rails, 40 pounds, at \$37.59 per ton of 2,240 pounds, complete with angle splice bars and bolts; extra angle splice bars and bolts necessary for 50 long tons of 40-pound steel rails, at 53 cents per set.

Approval: Not required.

Dates of beginning and expiration: All articles to be shipped from mill within fourteen days from date of contract.

Completed: Articles received April 29, 1905.

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<sup>a</sup> This contract is also shown in report for "Improving Columbia and lower Willamette rivers below Portland, Oreg."

Formal:

Name of contractor: J. W. Sweeney, Portland, Oreg.

Date of contract: April 10, 1905.

Character: Furnishing and delivering stone.

Quantity: 110,000 tons, more or less.

Price: \$1.02 per ton.

Approved: April 28, 1905.

Date of beginning: Within fifteen days after notification of approval of contract.

Date of expiration: December 31, 1905. (In force June 30, 1905.)

Formal:

Name of contractor: Columbia Contract Company, Portland, Oreg.

Date of contract: April 10, 1905.

Character: Furnishing and delivering stone.

Quantity: Approximately 450,000 tons.

Price: \$1.10 per ton.

Approved: April 28, 1905.

Date of beginning: Within fifteen days after notification of approval of contract.

Date of expiration: December 31, 1905. (In force June 30, 1905.)

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V V 6.

IMPROVEMENT OF CLATSKANIE RIVER, OREGON.

For details of this work, with status of improvement, see summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1905.

No work was done on the river during the fiscal year as the conditions were such that boats made regular uninterrupted trips to Clatskanie.

The expenditures during the fiscal year were on account of outstanding liabilities from the previous year and on account of expenses in fitting up the new mooring grounds below Portland.

The results, due to the completion of the project in 1900, were an increase of 2 feet in depth over that portion below the town of Clatskanie where work was done, and shortening the distance to the head of navigation by about 4,500 feet by straightening the channel.

It is believed that additional dredging operations will be necessary to maintain the improvement, and \$500 is accordingly named in the money statement. This, with the balance available, it is believed, will be sufficient at the present time.

Under date of August 20, 1904, a permit was granted the city of Clatskanie, Oreg., by the Secretary of War, to excavate a steamboat channel across a bend in Beaver Slough (one of the waters connecting the Clatskanie River with the Columbia River). This permit was granted under condition that the property should be deeded to the United States. The work was completed during the year, the deeds executed and forwarded for the action of the Attorney-General as to sufficiency of title.

The excavated channel effects a saving in distance of nearly 2 miles.

*Money statement.*

July 1, 1904, balance unexpended .....	\$1, 192. 63
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	123. 15
July 1, 1905, balance unexpended .....	<u>1, 069. 48</u>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	500. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

## APPROPRIATION.

March 3, 1899.....	\$13, 000
--------------------	-----------

## COMMERCIAL STATISTICS.

The following statement of traffic on the Clatskanie River has been compiled from reports of the various steamers and transportation companies doing business on this river during the year ending December 31, 1904:

Articles.	Quantity.	Articles.	Quantity.
	<i>Tons.</i>		<i>Tons.</i>
Wheat .....	45	Coal .....	16
Other cereals .....	550	Cattle and horses (number, 95).....	88
Flour and feed.....	220	Shingles.....	918
Potatoes .....	35	Piles (100,000 linear feet).....	2, 000
Fruit.....	4	Lumber (2,641,000 feet B. M.).....	3, 488
Hops.....	12	Logs (4,240,000 feet B. M.).....	8, 480
Hay.....	90		
General merchandise.....	8, 020	Total .....	<u>18, 861</u>

Passengers carried by river vessels, 525.

## V V 7.

## IMPROVEMENT OF COWLITZ AND LEWIS RIVERS, WASHINGTON.

For details of this work, with status of improvement, see summary of this report.

## (A) OPERATIONS DURING FISCAL YEAR 1905 FOR COWLITZ RIVER, WASHINGTON.

No work was done on the Cowlitz River during the fiscal year, the expenditures being on account of fitting out the new mooring grounds and in making repairs to plant preparatory to commencement of operations under funds appropriated by the river and harbor act of March 3, 1905.

The above-mentioned act appropriated \$10,000 for improvement of Cowlitz and Lewis rivers, and project for expenditure of these funds was submitted on March 27, 1905, recommending that the sum of \$4,400 be allotted for Cowlitz River. This project was approved

under date of April 7, 1905, and the work proposed consists of snagging, dredging, and revetment work, as may be deemed advisable.

At the close of the fiscal year work had been commenced on making repairs to the dredge to be used, and as soon as this is completed snagging and dredging will be taken up.

The balance available will all be needed for this work, and it is estimated that an additional sum of \$5,000 will be required for dredging and snagging, and this amount is therefore named in the money statement as a profitable expenditure and should be appropriated.

Money statement.

July 1, 1904, balance unexpended .....	\$819. 13
Amount appropriated by river and harbor act approved March 3, 1905 ..	4, 400. 00
	5, 219. 13
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	475. 42
July 1, 1905, balance unexpended .....	4, 743. 71
July 1, 1905, outstanding liabilities .....	50. 00
	4, 693. 71
July 1, 1905, balance available.....	4, 693. 71
Amount (estimated) required for completion of existing project .....	Indefinite.
Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905.....	
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	
	5, 000. 00

APPROPRIATIONS.

June 14, 1880 .....	\$2, 000	August 18, 1894 .....	\$3, 000
March 3, 1881 .....	1, 000	June 3, 1896 .....	3, 000
August 2, 1882 .....	1, 000	March 3, 1899 .....	3, 000
July 5, 1884.....	2, 000	June 13, 1902 (allotted).....	4, 750
August 5, 1886 .....	2, 000	March 3, 1905 (allotted) .....	4, 400
August 11, 1888 .....	3, 000		
September 19, 1890 .....	8, 000	Total .....	40, 150
June 13, 1892 .....	3, 000		

COMMERCIAL STATISTICS.

The following statement of traffic on the Cowlitz River has been compiled from reports of the various steamers and transportation companies doing business on this river during the year ending December 31, 1904.

Articles.	Quantity.	Articles.	Quantity.
	Tons.		Tons.
Cereals.....	720	Cattle and horses (number, 320).....	128
Flour and feed.....	2, 410	Sheep and hogs (number, 1,800).....	135
Potatoes .....	2, 700	Shingles.....	4, 900
Fruit.....	102	Piles (200,000 linear feet).....	4, 000
Fish .....	185	Lumber (1,460,000 feet B. M.).....	1, 898
Hops.....	88	Logs (80,345,000 feet B. M.) .....	160, 690
Hay.....	3, 700		
Wool.....	4	Total .....	186, 810
General merchandise.....	5, 200		

Passengers carried by river vessels, 6,875.

(B) OPERATIONS DURING THE FISCAL YEAR 1905 FOR LEWIS RIVER,  
WASHINGTON.

No work was done on the Lewis River during the fiscal year, the expenditures being on account of fitting out the new mooring grounds and in making repairs to plant preparatory to commencement of operations under funds appropriated by the river and harbor act of March 3, 1905.

The above-mentioned act appropriated \$10,000 for improvement of Cowlitz and Lewis rivers, and project for expenditure of these funds was submitted on March 27, 1905, recommending that the sum of \$5,600 be allotted for Lewis River. This project was approved under date of April 7, 1905, and the work proposed consists of snagging and dredging.

At the close of the fiscal year work had been commenced on making repairs to the dredge to be used, and as soon as this is completed snagging and dredging will be taken up.

The balance available will all be needed for this work, and it is estimated that an additional sum of \$5,000 will be required for dredging and snagging, and this amount is therefore named in the money statement as a profitable expenditure and should be appropriated.

*Money statement.*

July 1, 1904, balance unexpended .....	\$1,413.99
Amount appropriated by river and harbor act approved March 3, 1905. ....	5,600.00
	<hr/>
	7,013.99
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	328.98
	<hr/>
July 1, 1905, balance unexpended .....	6,687.03
July 1, 1905, outstanding liabilities .....	65.00
	<hr/>
July 1, 1905, balance available .....	6,622.03
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905. ....	5,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

## APPROPRIATIONS.

Act of March 3, 1899 .....	\$10,000
Appropriated by act of Congress approved June 13, 1902, for improving Cowlitz and Lewis rivers, Washington (allotted) .....	4,750
March 3, 1905 (allotted) .....	5,600
	<hr/>
Total .....	20,350



COMMERCIAL STATISTICS.

The following statement of traffic on the Lewis River has been compiled from reports of the various steamers and transportation companies doing business on this river during the year ending December 31, 1904:

Articles.	Quantity.	Articles.	Quantity.
	<i>Tons.</i>		<i>Tons.</i>
Cereals.....	1,600	Coal.....	25
Potatoes.....	3,000	Cattle and horses (number, 1,000).....	400
Fruit.....	60	Sheep and hogs (number, 1,200).....	90
Fish.....	140	Piles (50,000 linear feet).....	1,000
Hay.....	950	Lumber (5,720,520 feet B. M.).....	7,437
Wool.....	25	Logs (17,584,000 feet B. M.).....	35,168
General merchandise.....	5,075		
Wood (4,962 cords).....	7,443	Total.....	62,413

Passengers carried by river vessels, 12,885.  
Considerable quantities of timber products are also annually floated out of this stream.

V V 8.

GAUGING WATERS OF COLUMBIA RIVER, OREGON AND WASHINGTON.  
OPERATIONS DURING THE FISCAL YEAR 1905.

A self-registering tide gauge at Fort Stevens, Oreg., has been kept in operation during the fiscal year and daily bulletins of the gauge readings have been exhibited for the information of persons interested in navigation of the Columbia River.

A tide gauge was also established in the Columbia River near the mouth of the Willamette and daily record of the readings kept.

In view of the importance of these gauge readings as a benefit to pilots and others, the keeping of the records is considered a worthy object.

The amount expended during the year was for the hire of gauge keepers.

*Money statement.*

July 1, 1904, balance unexpended .....	\$1,292.99
Amount appropriated by river and harbor act approved March 3, 1905..	1,000.00
	<hr/> 2,292.99
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	149.51
	<hr/> 2,143.48
July 1, 1905, balance unexpended .....	2,143.48
July 1, 1905, outstanding liabilities .....	11.00
	<hr/> 2,132.48
<hr/>	
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	1,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

## APPROPRIATIONS.

August 2, 1882 .....	\$500	March 3, 1899.....	\$1, 000
July 5, 1884.....	1, 000	June 13, 1902 .....	1, 000
August 5, 1886 .....	1, 000	March 3, 1905.....	1, 000
August 11, 1888 .....	2, 500		
August 18, 1894 .....	1, 000	Total .....	10, 000
June 3, 1896 .....	1, 000		

## V V 9.

## REPORT OF BOARD OF ENGINEERS RELATIVE TO EFFECT OF FURTHER IMPROVEMENT BY THE UNITED STATES OF CANAL AND LOCKS AT WILLAMETTE FALLS, WILLAMETTE RIVER, OREGON, ON MANUFACTURING ENTERPRISES THERE.

[Printed in House Document No. 99, Fifty-eighth Congress, third session.]

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
*Washington, December 10, 1904.*

SIR: The river and harbor act approved June 13, 1902, contains the following item:

Canal and locks at Willamette Falls, Willamette River, Oregon: The Secretary of War is hereby authorized and directed to ascertain, through a board of engineers or otherwise, and report to the House, whether either the acquisition of the present canal and locks at Willamette Falls, Oregon, or a construction of new canal and locks by the United States Government and their operation for the exclusive benefit of the navigation of said river, would, by withdrawing the waters of the Willamette River from the channels in which they have been accustomed to flow or otherwise, injure in a material manner the operations of the manufacturing enterprises now in operation or contemplated at the falls of the Willamette River.

With a view to carrying out the above-quoted provision of law, the Secretary of War authorized the appointment of a Board of officers of the Corps of Engineers, consisting of Maj. John Millis, Capt. W. C. Langfitt, and First Lieut. Robert P. Johnston, to investigate and report on the subject. In its report, dated November 29, 1902, the Board expresses the opinion that certain changes being made, as indicated in its report—

the acquisition of the present canal and locks at Willamette Falls, Oregon, or a construction of new canal and locks by the United States Government and their operation for the exclusive benefit of the navigation of said river would not injure in a material manner the operations of the manufacturing enterprises now in operation or contemplated at the falls of the Willamette River.

In this connection the act further provides that the Secretary of War shall also—

ascertain, through the Department of Justice or otherwise, and report to Congress, whether the Portland General Electric Light Company, of Oregon, by virtue of its ownership of certain real property at Willamette Falls, in the Willamette River, Oregon, has a legal, valid, and existing right and title, as against the United States, for the full, free, and continued use of the waters of the Willamette River for the use of the manufacturing enterprises now located on their property, whether such water is needed for navigation or not, and if so, what method would be necessary on the part of the United States Government to acquire title to such water for the purpose of navigation, and the measure of damages it must pay to such company.

Upon the receipt of the report of the Board of Engineers referred to a copy thereof was sent to the Attorney-General by the Secretary

of War, inviting his attention to the item of law last quoted above and requesting that the information called for therein be furnished this Department for transmission to Congress as required. The opinion of the Department of Justice on the points raised was communicated to this Department under date of November 11, 1904, and is as follows:

It necessarily follows from the foregoing conclusions that neither the Portland General Electric Company nor any other person except the United States, for the purpose of commerce, has any valid and existing right to the "full, free, and continued use of the waters of the Willamette River for the use of manufacturing enterprises now located on their property."

The United States, if it should be deemed necessary, has the absolute right to the entire flow of the waters of a navigable river, and may, in the exercise of this right, close up one channel and divert the entire flow to another for the purpose of improvement, and to those persons who suffer loss thereby it is *damnum absque injuria*.

I have the honor to inclose copies of the several reports in this case for transmission to the Speaker of the House of Representatives.

Very respectfully,

A. MACKENZIE,  
*Brig. Gen., Chief of Engineers, U. S. Army.*

Hon. WM. H. TAFT,  
*Secretary of War.*

#### REPORT OF THE BOARD.

PORTLAND, OREG., *November 29, 1902.*

GENERAL: The Board of Engineers appointed by Special Orders, No. 19, dated Headquarters, Corps of Engineers, United States Army, Washington, July 5, 1902, have the honor to submit the following report:

The order is as follows:

[Extract.]

\* \* \* \* \*

10. By authority of the Secretary of War and in accordance with the provisions of the river and harbor act of June 13, 1902, a Board of officers of the Corps of Engineers, to consist of Maj. John Millis, Capt. William C. Langfitt, First Lieut. Robert P. Johnston, will assemble at Portland, Oreg., upon the call of the senior member, to ascertain and report whether either the acquisition of the present canal and locks at Willamette Falls, Oregon, or a construction of new canal and locks by the United States Government and their operation for the exclusive benefit of the navigation of said river would, by withdrawing the waters of the Willamette River from the channel in which they have been accustomed to flow, or otherwise, injure in a material manner the operations of the manufacturing enterprises now in operation or contemplated at the falls of the Willamette River.

The Board is authorized to visit such points as it deems necessary for the proper performance of its duties.

\* \* \* \* \*

By command of Brig. Gen. GILLESPIE:

CHAS. S. BROMWELL,  
*Captain, Corps of Engineers.*

Captain Langfitt, district engineer in charge of the work, was requested to obtain for the Board the low-water discharge of the Willamette River at the falls, the consumption of water required to operate the canal and locks at the maximum rate which would be at all profitable,

the consumption of water by manufacturing enterprises now in operation or contemplated, and such other data as would enable the Board to arrive at a conclusion. The necessary information having been obtained, the Board met at Portland, Oreg., at 9 a. m., on November 21, 1902. The Board, after a preliminary discussion, proceeded to Oregon City and made a personal inspection of the canal and locks and manufacturing establishments. The Board then returned to Portland, Oreg.

The low-water discharge of the river, as found by Captain Langfitt, is 4,935 cubic feet per second. The Portland General Electric Company, which claim the control of the falls, report the low-water discharge of the river at about 5,651 cubic feet per second. This measurement was taken on October 9, 1891, when the river was practically at low-water stage. It is therefore safe to say that the low-water discharge of the river is about 5,000 cubic feet per second.

The present consumption of water through the canal and locks for navigation purposes is estimated by the owners at 25 cubic feet per second, including leakage. The total consumption of water for manufacturing and power purposes at low water at present, as reported by the Portland General Electric Company, is 4,500 cubic feet per second, and they hope to increase this consumption up to practically the limit of low-water discharge, or, putting it at their measurement, up to about 5,700 cubic feet per second.

Any estimate of the consumption of water by lockage must necessarily be very rough, but assuming three lockages per hour, all one way, the total used would be 252,000 cubic feet per hour, and allowing 50 per cent for leakage, the total volume would be 378,000 cubic feet per hour, or 105 cubic feet per second. This is about 2 per cent of the total discharge at low water. Such a large amount of lockage as this would not take place for many years to come, if ever, and it may therefore be stated that the necessary amount of water for lockage purposes if drawn from the river would not injure appreciably the manufacturing enterprises now in operation there or contemplated, provided the canal supplying power for the enterprises is entirely separate from the canal for navigation purposes, and provided the entrances are properly located with respect to each other. This condition is fulfilled by the new canal suggested in report of Board of Engineers dated November 24, 1899, printed in House Document No. 202, Fifty-sixth Congress, first session, and report of Chief of Engineers for 1900, pages 4368-4415. At high water the proportion used by the canal will be absolutely inappreciable.

In the present canal a large part of the water for power purposes is taken directly from the canal basin, and this not only induces a strong current in the guard lock, which is objectionable, but also lowers the water in the basin, reducing the draft which can be carried through.

If the United States purchased this canal and operated it under present conditions there would be interference either with navigation or the manufacturing enterprises, but this interference could be obviated either by building a dividing wall to separate the navigation from the power canal, or by the necessary power being supplied electrically to the factories which cause the trouble and closing their intakes at the canal, or perhaps by still other means.

The Board, therefore, after due consideration, report that, in its opinion, provided certain changes are made as indicated in preceding

paragraph, the acquisition of the present canal and locks at Willamette Falls, Oregon, or a construction of new canal and locks by the United States Government, and their operation for the exclusive benefit of the navigation of said river would not injure, in a material manner, the operations of the manufacturing enterprises now in operation or contemplated at the falls of the Willamette River.

Respectfully submitted.

JOHN MILLIS,  
*Major, Corps of Engineers.*

W. C. LANGFITT,  
*Captain, Corps of Engineers.*

ROBERT P. JOHNSTON,  
*First Lieut., Corps of Engineers.*

Brig. Gen. G. L. GILLESPIE,  
*Chief of Engineers, U. S. A.*

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LETTER OF THE ACTING ATTORNEY-GENERAL.

DEPARTMENT OF JUSTICE,  
*Washington, D. C., November 11, 1904.*

SIR: Referring to the inclosed letter<sup>a</sup> of the Chief of Engineers, addressed to the Secretary of War, under date of December 6, 1902, and to the indorsement<sup>a</sup> made thereon by the then acting Secretary of War, requesting information relative to the right of the Portland General Electric Light Company as against the United States, if any, to the use of the waters of the Willamette River for the purposes indicated in said letter, etc., I have the honor to transmit to you herewith a copy of a report received from the United States attorney for the district of Oregon, dated the 17th ultimo, giving the result of a careful examination of the subject made by him pursuant to instructions of this Department. In his conclusions I fully concur.

The copy of the report of the Board of Engineers which accompanied the above-mentioned letter of the Chief of Engineers is returned therewith.

I am, sir, very respectfully.

H. M. HOYT,  
*Acting Attorney-General.*

The SECRETARY OF WAR.

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<sup>a</sup> Not printed.

## LETTER OF THE UNITED STATES ATTORNEY FOR THE DISTRICT OF OREGON.

DEPARTMENT OF JUSTICE,  
OFFICE OF THE UNITED STATES ATTORNEY,  
DISTRICT OF OREGON,  
*Portland, October 17, 1904.*

SIR: In compliance with your direction, contained in letter of October 5, 1904, \* \* \* I have given the subject a careful examination, and my conclusions are herewith submitted.

The inquiry, subdivided, is—

First. Has the Portland General Electric Light Company, of Oregon, by virtue of its ownership of certain real property at Willamette Falls, in the Willamette River, at Oregon City, a legal, valid, and existing right and title as against the United States for the full, free, and continued use of the waters of the Willamette River for the use of manufacturing enterprises now located on their property, whether such water is needed for navigation or not?

Second. What method would be necessary on the part of the United States Government to acquire title to such water for the purpose of navigation?

Third. What would be the measure of damages the Government must pay to said company for the appropriation of the waters of the Willamette River at that point for the purpose of navigation?

As to the first proposition, I will say that the Willamette River, both below and above the obstruction at Oregon City, is a navigable stream for boats of considerable tonnage, and is a common highway for commerce from the interior portion of the State of Oregon to the Columbia River, and from thence to the sea; and it is unnecessary to cite authorities to the effect as to what constitutes a navigable river in the United States, as it has been determined by the Supreme Court of the United States in many cases that a stream which is navigable in fact comes within the jurisdiction of the United States so far as its improvement and their removal of obstruction therein is concerned.

Upon the accession of the Territory of Oregon to the United States, whether acquired by discovery or by purchase from France, the United States became the owner of the soil and held the fee therein, including the lands in the beds of navigable streams extending to high-water mark, not only in those streams where the tide ebbs and flows, but also to those which were navigable in fact.

The title to this latter class of property was held by the United States as trustee for the future State when created. Therefore, when the State of Oregon was admitted into the Union in 1859 the title to said lands in the beds of streams extending to ordinary high-water mark became vested in the State of Oregon, and the State became thereby empowered to dispose of such lands at will, subject, however, and subordinate to the right of the Congress to make necessary improvements to facilitate navigation, and to regulate commerce thereon. By the laws of the State of Oregon, as established by the decision of the Supreme Court, the owner of upland bounded by navigable waters acquires no title in the adjacent lands below high-water mark, and has no right to build wharves or other structures thereon, except as expressly permitted by the statutes of the State; but the



State has the titles in those lands, and unless they have been sold, or built upon with its permission, has the right to sell and convey them to anyone, free of any right of the proprietor in the upland, and subject only to the paramount right of navigation inherent in the public. (Shively *v.* Bowlby, 152 U. S., p. 52; Hinman *v.* Warren, 6th Oregon, 408; Parker *v.* Taylor, 7th Oregon, 436; Bowlby *v.* Shively, 22d Oregon, 410; Shively *v.* Welch, 10th Sawyer, 136-141.)

In Shively *v.* Bowlby, *supra*, page 31, Justice Gray says:

The earliest judicial statement of the now-prevailing doctrine in this country as to the title in the soil of rivers really navigable, although above the ebb and flow of the tide, is to be found in the case involving the claim of a riparian proprietor to an exclusive fishery in the Susquehanna River, in which Chief Justice Tilghman in 1870, after observing that the rule of the common law upon the subject had not been adopted in Pennsylvania, said: "The common-law principle is, in fact, that the owners of the banks have no right to the water of navigable rivers. Now, the Susquehanna is a navigable river, and therefore the owners of its banks have no such right. It is said, however, that some of the cases assert that by navigable rivers are meant rivers in which there is no flow or reflow of the tide. This definition may be very proper in England, where there is no river of considerable importance as to navigation which is not a flow of the tide, but it would be highly unreasonable when applied to our large rivers, such as the Ohio, Allegheny, Delaware, Schuylkill, or Susquehanna and its branches.

It may be therefore considered as established that the Willamette River is a navigable stream, that the grantees of the land bordering thereon took from the United States only to ordinary high-water mark, and that the land below high-water mark in the bed of the stream passed to the State of Oregon by virtue of her sovereignty when she was admitted into the Union.

It may, however, be contended that, as the Willamette River lies wholly within the State of Oregon, the Government has no control over it, and no right to remove obstructions, artificial or otherwise, by virtue of its power "to regulate commerce," or by virtue of an act of Congress of February 14, 1859, admitting the State of Oregon into the Union, which provides:

That the navigable waters of the State shall be common highways and forever free to all of the citizens of the United States.

This question is very ably discussed by Mr. Justice Bradley, in the case of the Willamette Iron Bridge Company *v.* Hatch, reported in 125 United States, page 1, which was a suit brought to restrain the construction of a bridge across the Willamette River, at the city of Portland, upon the ground that it was an obstruction to navigation, and that under the authority above quoted the jurisdiction over said river was exclusively vested in the United States, and Mr. Justice Bradley, in discussing the clause above quoted in the act admitting the State, on page 2, says:

The clause in question can not be regarded as establishing the police power of the United States over the rivers of Oregon, or as to giving to the Federal courts the right to hear and determine, according to Federal law, every complaint that may be made of an impediment in, or an encroachment upon, the navigation of those rivers. We do not doubt that Congress, if it saw fit, could thus assume the care of said streams, in the interest of foreign and interstate commerce; we only say that in our opinion it has not done so by the clause in question. And although, until Congress acts, the States have the plenary power supposed, yet, when Congress chooses to act, it is not precluded by anything that the States, or the individuals by its authority or acquiescence, have done from assuming entire control of the matter, and abating any erections that may have been made, and preventing any others from being made, except in conformity with such regulations as it may impose.



Under this decision the only thing necessary would be for Congress to enact a law authorizing the officers of the United States to remove the obstructions or make necessary improvements in the Willamette River at this point.

The only legislation upon this subject since the rendition of the opinion by Justice Bradley is found upon pages 1151, 1152, 1153, and 1154, volume 30, United States Statutes at Large, and contained in the general appropriation bill for the fiscal year ending June 30, 1900. But this latter act, and the acts of which it is amendatory, were construed by Mr. Justice Harlan in the case of *Cummings v. Chicago* (188 U. S., 410), not to deprive the States of their jurisdiction over streams wholly within their borders, nor to confer the exclusive jurisdiction over such navigable streams upon the United States, but the court holds that Congress may by appropriate legislation upon the subject assume such jurisdiction.

It necessarily follows from the foregoing conclusions that neither the Portland General Electric Company nor any other person except the United States, for the purpose of commerce, has any valid and existing right to the "full, free, and continued use of the waters of the Willamette River for the use of manufacturing enterprises now located on their property."

The United States, if it should be deemed necessary, has the absolute right to the entire flow of the waters of a navigable river, and may, in the exercise of this right, close up one channel and divert the entire flow to another for the purpose of improvement, and to those persons who suffer loss thereby it is *damnum abseque injuria*. (*South Carolina v. Georgia*, 93 U. S., p. 4; *Shively v. Bowlby*, 152 U. S., p. 1; *Gibson v. United States*, 166 U. S., p. 269; *Transportation Company v. Chicago*, 99 U. S., p. 635; *Scranton v. Wheeler*, 57 Fed., p. 803.)

The last case cited was decided by the court of appeals of the sixth circuit, and is very similar to the case now under discussion, and in my judgment states the law applicable in this case. I am therefore thoroughly convinced that, if authorized by an act of Congress, the United States would have authority to construct at the falls of Oregon City, between high and low water mark, locks, canals, and other improvements, and that if this should result in injury to riparian owners, or to canals and locks owned by private individuals, while their damage might be very great, they would have no remedy as against the United States.

If, however, it should become necessary in the construction of such work by the Government to utilize the land of private individuals above high-water mark, this would require a suit for condemnation of such lands, and the measure of damage would be the value of the lands taken and the damage to the remaining lands, exclusive, however, of the question of the diversion of the water for the purpose of navigation.

If it should be the desire of the Government to acquire the locks already constructed and operated at Willamette Falls, the measure of damage would be the actual present and prospective value of locks, together with the damage suffered by the depriving of owners thereof of the right to take water therefrom for manufacturing or other commercial purposes.

Respectfully submitted.

JOHN H. HALL,  
*United States Attorney.*

The ATTORNEY-GENERAL.



## APPENDIX W W.

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### IMPROVEMENT OF CERTAIN RIVERS AND HARBORS IN WASHINGTON.

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REPORT OF MAJ. JOHN MILLIS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905, WITH OTHER DOCUMENTS RELATING TO THE WORKS.

#### IMPROVEMENTS.

- |  |   |
|--|---|
| 1. Willapa River and Harbor, Washington.   | 8. Everett Harbor, Washington.  |
| 2. Grays Harbor and bar entrance, Washington.  | 9. Snohomish River at Stretch riffle.                                       |
| 3. Grays Harbor, inner portion, between Aberdeen and the entrance to said harbor and Chehalis River, Washington. | 10. Swinomish Slough, Washington.   |
| 4. Puget Sound and its tributary waters, Washington.   | 11. New Whatcom Harbor, Washington.   |
| 5. Harbor at Olympia, Washington.  | 12. Okanogan and Pend Oreille rivers, Washington.                           |
| 6. Tacoma Harbor, Washington.  | 13. Inspection, etc., of fish traps, Puget Sound, Washington.               |
| 7. Waterway connecting Puget Sound with Lakes Union and Washington, Washington.                                  | 14. Removing sunken vessels or craft obstructing or endangering navigation. |
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UNITED STATES ENGINEER OFFICE,  
*Seattle, Wash., July 15, 1905.*

GENERAL: I have the honor to forward herewith \* \* \* annual reports of the river and harbor works in my charge for the fiscal year ending June 30, 1905.

Very respectfully, your obedient servant,

JOHN MILLIS,  
*Major, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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#### W W I.

### IMPROVEMENT OF WILLAPA RIVER AND HARBOR, WASHINGTON.

Under the authority of the act of June 13, 1902, and the project approved November 19, 1902, the balance available is to be expended in repair and maintenance of existing work and in snagging and otherwise improving the North and Nasel rivers.

Several inspections of the existing works, which consist of dikes near South Bend, and of North and Nasel rivers were made during the year, but no work was done.

Several efforts were made to induce owners of fish traps and log booms in North and Nasel rivers to conform to the laws relative to obstructions to navigation, but without material results.

The full amount for improvement as heretofore authorized by Congress has been appropriated.

*Money statement.*

July 1, 1904, balance unexpended .....	\$1,886.06
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	336.84
July 1, 1905, balance unexpended .....	1,549.22
<hr/>	
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	500.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

July 13, 1892.....	\$18,000
August 18, 1894 .....	13,350
March 3, 1899.....	5,000
Total .....	36,350

COMMERCIAL STATISTICS.

*Shipping.*

	Arrived.	Departed.
Steam vessels.....	31	31
Sail vessels .....	59	59
Total .....	90	90

Maximum draft, 19 feet.

Number of passengers carried, 50.

Thirty-eight steam and gasoline vessels, with a total gross tonnage of 546 tons and a maximum draft of 11 feet, were engaged in local traffic.

*Exports and imports.*

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
Lumber and products.....	Tons. 72,808	\$325,877	Tons. 1,500	\$63,500
Miscellaneous merchandise.....				
Total.....	72,808	325,877	1,500	63,500

## REPORT OF MR. E. L. CARPENTER, JUNIOR ENGINEER.

HOQUIAM, WASH., June 29, 1905.

MAJOR: I have the honor to submit the following report on the commerce of Willapa Harbor for the calendar year 1904.

The ocean commerce of the harbor shows a decrease from 1903 in value of about \$100,000. This, however, is accounted for in the decreased value of the exports, as the quantity remained about the same and the quantity of the imports shows an increase of about 50 per cent.

The local commerce of the harbor and tributary streams amounted in 1904 to \$596,248. The principal item was logs, 80,313,999 feet B. M., valued at \$464,562.

The only industries of any importance on the harbor are lumber and oysters.

There are four lumber mills and one shingle mill on the harbor, the lumber mills having a combined capacity of about 305,000 feet per day. There was no great increase in the output during the year. A combined sawmill and veneer plant was built at Raymond, on the Willapa River, in 1904, but it has not been operated.

It is difficult to assign any reason for the lack of development of the lumbering industry on Willapa Harbor. It does not appear to be due to transportation deficiencies either of rail or water. The channel over the outer bar is deeper and better than the Grays Harbor bar, and of late years is equal to that of the Columbia River.

It is true that there are shoals in the inner harbor, but there is better water on them and they are of less extent than the shoals of inner Grays Harbor. It may be that the lumbering industry, having become centered in Grays Harbor and the Columbia River, has a detrimental effect, but whatever the cause it is plain that while the industry is not stagnant, it has not kept pace with similarly situated harbors on the North Pacific coast.

Willapa Harbor has a large amount of timber tributary to it, but from recent developments it appears likely that a considerable quantity of it will be manufactured into lumber on Grays Harbor and the Columbia River, as already logging railroads have been built over the divides and are hauling timber naturally tributary to Willapa Harbor to the mills of Grays Harbor and the Columbia River.

The oyster industry is developing very rapidly, especially the growing of what are known as Toke Point oysters, raised from eastern seed. This year (1905) about \$50,000 worth of eastern seed oysters have been planted in the waters of Willapa Harbor.

The general business of the harbor has increased on an average about 10 per cent in the last year and a half, the principal increase being in the oyster business. The value of city property has increased about 20 per cent, and the value of cleared land about 12 per cent. There has been very little increase in the amount of acreage under cultivation, but few new settlers coming into the country.

There has been no new industries started this year. The Columbia Box and Lumber Company are building a new mill in South Bend, but as they are to abandon their old one there will be no increase either in number or capacity of mills on the harbor.

Eighty-eight vessels sailed coastwise during 1904. Of these, 57 were sailing vessels and 31 steamers. Of the sailing vessels 40 were schooners and 17 barkentines. The largest vessel was the 5-masted schooner *Louis*, 193.8 feet long, 36 feet beam, 18 feet depth of hold, 819 tons net. The barkentine *Arago* is a fair average of the sailing vessels frequenting the harbor. Her dimensions are, length 176.4, breadth 38.8, depth of hold 12.2, and net tonnage 476. Her carrying capacity is about 750,000 feet B. M. There are no sailing vessels running regularly to the harbor.

The steamer *Sequoia* runs regularly between South Bend and San Francisco, making 24 round trips in 1904, carrying lumber out and miscellaneous merchandise in. Her dimensions are, length 151, breadth 33.7, depth of hold 12 feet, and net tonnage 259. Her carrying capacity is about 475,000 feet B. M. Seven other steamers of the same general type sailed coastwise from South Bend during the year.

The coastwise traffic was entirely with California ports.

Two sailing vessels went foreign in 1904—barkentines *Alumna* and *Omega*. Their combined cargoes amounted to 1,665,304 feet B. M. lumber, valued at \$12,196.64.

Very respectfully, your obedient servant,

E. L. CARPENTER,  
Junior Engineer.

Maj. JOHN MILLIS,  
Corps of Engineers.

## W W 2.

## IMPROVEMENT OF GRAYS HARBOR AND BAR ENTRANCE, WASHINGTON.

The enrockment of the jetty has been practically completed to the level of ordinary high tide, a distance of 13,784 feet outside the ocean high-water line. The groin at right angles to the jetty on the north side at bent 1050 has been constructed. The end of the groin is 508 feet north of the jetty.

Under the approved project the total length of the jetty is to be 18,200 feet; 4,420 feet therefore remain to be built.

No construction work has been in progress during the year on account of lack of funds. Property and plant have been cared for by a watchman.

Survey of the bar was made in August, 1904, and map prepared under local charge of Mr. E. L. Carpenter, junior engineer.

The jetty trestle has continued to suffer severely under the action of storms, and the condition of the bar channel has not generally been favorable. Nineteen feet at low water is the best depth reported during the year.

The available channel depth has at times been only 15 feet. The end of the jetty being submerged, it is dangerous for vessels to use the best channel when, as sometimes occurs, this is found near to and across the jetty terminus. In November, 1904, a vessel struck and passed over the jetty in trying to go through the channel near the end and was very badly damaged.

The work has been under the local charge of Mr. E. L. Carpenter, junior engineer, stationed at Hoquiam.

The following are extracts from his annual report:

Present condition of the jetty:

The enrockment appears to be in good condition. \* \* \* All the remaining portion of the jetty trestle west of bent 622 was carried away by the winter storms. The present end of the trestle is bent 622, 4,496 feet west of the original ocean high water line.

East of bent 622 to the ocean high water line the trestle is all standing, but is in poor condition, due to the ravages of teredo.

Between the ocean high water line and the receiving wharf the trestle is in fairly good shape except a few bents in front of the mess house, where a number of piles have been destroyed by limnoria.

\* \* \* \* \*

Very little change has taken place in the low and high water lines in the vicinity of the jetty since the last survey was made.

*Condition of the bar.*—The survey of the bar made in August, 1904, showed a controlling depth in the channel around the end of the jetty of 14 feet at mean lower low water, and a depth of 18 feet in the main or buoyed channel. In October, 1904, the channel around the end of the jetty deepened to 18 feet. Thereupon vessels abandoned the north channel and used this new channel. This channel continued to hold its depth, even increasing to 21 feet at times, until the latter part of May, 1905, when it suddenly shoaled to 14 feet. At present the south channel has a controlling depth of 14 feet at mean lower low water, and the north channel of 15 feet at mean lower low water.

Appropriations have already been made to the limit of cost heretofore authorized by Congress. The demands for the further improvement of the bar channel are very urgent.

By the act of March 3, 1905, an appropriation of \$30,000 was made for the maintenance of the work. At the close of the fiscal year a project for the application of this appropriation had been submitted and was under consideration by the Chief of Engineers.

*Money statement.*

July 1, 1904, balance unexpended .....	\$2, 385. 02
Amount appropriated by river and harbor act approved March 3, 1905..	30, 000. 00
	<hr/>
	32, 385. 02
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	1, 250. 34
	<hr/>
July 1, 1905, balance unexpended .....	31, 134. 68
July 1, 1905, outstanding liabilities .....	208. 25
	<hr/>
July 1, 1905, balance available .....	30, 926. 43
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	5, 000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

June 3, 1896 .....	\$20, 000	June 28, 1902 .....	\$156, 775
June 4, 1897 .....	350, 000	March 3, 1905 .....	30, 000
March 3, 1899 .....	285, 000		
June 6, 1900 .....	50, 000		
March 3, 1901 .....	138, 225	Total .....	1, 030, 000

COMMERCIAL STATISTICS.

*Shipping.*

	Arrivals.	Departures.
Steam vessels .....	199	199
Sail vessels .....	293	294
Total .....	492	493

Maximum draft, 18.8 feet.

*Exports and imports.*

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>	
Clams, canned .....	883	\$4, 079		
Coal and iron .....			2, 588	\$181, 606
Flour and feed .....			591	14, 184
Fruit and vegetables .....			1, 450	95, 990
Lumber and products .....	483, 011	2, 773, 144		
Machinery .....			775	306, 816
Salmon, canned .....	56	5, 760		
Wood .....	227	655		
Miscellaneous merchandise .....			5, 914	818, 550
Total .....	484, 177	2, 783, 638	11, 818	1, 417, 146



## REPORT OF MR. E. L. CARPENTER, JUNIOR ENGINEER.

HOQUIAM, WASH., *June 29, 1905.*

MAJOR: I have the honor to submit the following report on the commerce of Grays Harbor for the calendar year 1904:

The value of the ocean commerce for 1904 shows an increase over that of 1903 of \$127,451, the respective amounts being \$4,200,784 and \$4,073,333. The value of the exports decreased \$216,437. This was not caused by any decrease in production, but by decreased prices of the products of the harbor, which consist entirely of lumber. The quantity of exports increased slightly.

Imports increased in value \$343,813.

The commerce of the inner harbor increased \$145,674, exclusive of logs. The greater part of this is due to the fact that in 1903 and previous, steamers from San Francisco having freight for Hoquiam delivered it at Hoquiam, but in 1904 it was taken to Aberdeen and delivered by local boats.

General business on the harbor is in a healthy state and is rapidly increasing. All the towns on the harbor are increasing in population and general appearance. This is particularly true of Hoquiam and Aberdeen. Aberdeen, which suffered a disastrous fire in 1903, the business section being wiped out, has rebuilt entirely of brick and stone. The country districts have not kept pace with the growth of the towns. Very little new land has been put under cultivation and not much clearing has been done, except for manufacturing establishments and additions to towns. There has, however, lately been an increased demand for logged-off lands, and it is expected that the next year will show a big increase in the amount of land under cultivation.

Manufacture on the harbor is confined to lumber and lumber products, with the exception of three iron works which are devoted solely to the manufacture and repair of sawmill and logging machinery.

The total capacity of the lumber mills on the harbor in 1904 was 1,500,000 feet B. M. per day of ten hours. At the present time the combined capacity is 1,760,000 feet B. M. per day. There are building on the harbor at the present time two sawmills having a combined capacity of 240,000 feet B. M. per day, one shingle mill with a capacity of 20,000 feet B. M., and one mill is enlarging its capacity 100,000 feet B. M. per day. These will all be running by the end of the year and at that time the combined capacity of all the mills on the harbor will be 2,120,000 feet B. M. per day of ten hours. The capacity of the logging camps on the harbor at present is about 2,000,000 feet B. M. per day.

Other manufacturing establishments being built at the present time are two fish canneries; plant for the manufacture of brick, Aberdeen, cost \$30,000; plant for the utilization of the waste products of lumber mills, Aberdeen, cost \$80,000; gas plant, Aberdeen, cost \$30,000.

A bridge is in course of construction at Aberdeen, over the Chehalis River, at a cost of about \$75,000, to connect Aberdeen with South Aberdeen. The electric line between Hoquiam and Aberdeen, which was opened for traffic in 1904, is now being extended to Cosmopolis.

In 1904 a marine railroad was constructed in Aberdeen capable of taking vessels 200 feet long.

The peninsular branch of the Northern Pacific, which has been under construction from Hoquiam north for the past three years, will be opened for traffic as far as the Moclips River on July 1. This will open up a large section of country, containing a vast amount of valuable timber, which has heretofore been without transportation facilities.

The number of vessels departing coastwise and foreign during 1904 were 294 sailing vessels and 199 steamers. There was an increase in the number of sailing vessels over 1903 of 35 and a decrease in the number of steamers of 29. It does not appear that the decrease in the number of steamers was due to local conditions.

The size or type of vessels engaged in ocean traffic has not changed for several years, the size of the vessels being limited to those of 600 to 700 tons burden by the condition of the outer bar and inner channels. Any increase in the depth of water on the outer bar and inner harbor would be followed immediately by increased size of vessels and increased exports.

The outer bar has shoaled up lately to 14 feet at mean lower low water, and if the depth does not materially increase by next winter the size of the vessels engaged in the ocean traffic must materially decrease or they will experience prolonged delays at the bar.

There is no question, I think, that if larger vessels could load on the harbor the exports of the harbor would largely increase. This is certainly true of the foreign trade. The foreign exports from Grays Harbor have fallen off for several years

owing to the inability of the local mills to compete with mills on the Sound and Columbia River on account of the small vessels the local mills are compelled to ship in.

The foreign trade in 1904 amounted to 19,558,125 feet B. M. lumber, valued at \$197,644, and in 1903 to 22,461,460 feet B. M. lumber, valued at \$342,733.

The bulk of the foreign shipments in 1904 went to Mexico and the west coast of South America.

There are seven steamers that run regularly between Grays Harbor and California ports. They have no regular schedule, the frequency of their trips depending on weather conditions, etc.

Very respectfully, your obedient servant,

E. L. CARPENTER,  
*Junior Engineer.*

Maj. JOHN MILLIS,  
*Corps of Engineers.*

### W W 3.

#### IMPROVEMENT OF GRAYS HARBOR, INNER PORTION, BETWEEN ABERDEEN AND THE ENTRANCE TO SAID HARBOR, AND CHEHALIS RIVER, WASHINGTON.

The general project approved November 5, 1902, contemplates dredging a channel through the shoals near Aberdeen and Hoquiam, snagging and clearing obstructions from the Chehalis River, and repairing the dikes.

During the year all of the above were in progress. Contract was made with Creech Brothers, of Aberdeen, for repairing the dikes. Work was completed on the Cow Point dike and the middle channel dike. The expenditures on this part of the work amounted to \$10,004.83.

Under contract with the Puget Sound Bridge and Dredging Company for dredging at 13.8 cents per cubic yard the Hoquiam channel was completed. A total of 227,624 cubic yards was taken out at a cost of \$31,412.12. The dredging was completed on July 28, 1904.

The usual snagging and removal of obstructions was done in the Chehalis River.

The work was in local charge of Mr. E. L. Carpenter, junior engineer, during the year.

The following are extracts from his annual report:

*Repairing dikes.*—At the beginning of the fiscal year repairs to Cow Point dike were practically completed, and work was in progress on the middle channel dike.

Repairs to the dikes were completed September 12, 1904.

The work of repairing these dikes consisted of replacing missing piles, replacing or repairing lining and waling, and refilling the dikes with brush and stone. The only trouble experienced was on August 30, when the flood tide cut under the mattress of the middle channel dike and lowered the mattress 3 feet for a distance of 400 feet along the south end of the dike. The mattress was then reroaked and no further trouble was experienced.

Following are the amounts of material used during the fiscal year:

Lumber, 26,915 feet B. M., at \$14.90.....	\$401. 04
Spikes, 2,233 pounds, at 6 cents.....	133. 98
Brush, 578.4 cords, at \$2.94.....	1,700. 49
Stone, 684.3 tons, at 98 cents.....	670. 61
Bolts, 34, at 27 cents.....	9. 18
Total .....	2,915. 30

Following is the total amount of material used under contract:

Piles, 4,746 linear feet, at 13 cents.....	\$616. 98
Lumber, 155,938 feet B. M., at \$14.90.....	2,323. 48

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Spikes, 13,054 pounds, at 6 cents.....	\$783. 24
Brush, 1,557.47 cords, at \$2.94.....	4, 578. 96
Stone, 1,819.03 tons, at 98 cents.....	1, 782. 65
Bolts, 34, at 27 cents.....	9. 18
Total .....	10, 094. 49

The present condition of the dikes is very good and no repairs are needed. The filling of the middle channel dike has settled some in places, but the settlement is not excessive.

*Dredging.*—At the beginning of the fiscal year a cut 100 feet wide on the bottom and 15 feet deep at mean lower low water, 8,140 feet long, had been made through Cow Point bar, and a cut 4,370 feet long had been made in the Hoquiam shoal of the same depth and width as the Cow Point Cut, and work was still in progress on the Hoquiam shoal.

The dredging was finished July 28, 1904; 4,000 feet of the channel, 100 feet wide on the bottom and 15 feet deep at mean lower low water, having been excavated through the Hoquiam shoal during the fiscal year.

Owing to the depletion of the funds the channel was not excavated through to deep water near Grays Harbor city wharf. To complete the channel would require the excavation of about 3,700 feet of channel, containing about 42,000 cubic yards.

The dredged material consisted of sea sand with a very small percentage of mud. The dredged material was deposited on the land side of the channel, 850 feet distant.

The amount of excavation during the fiscal year was 61,897 cubic yards, at 13.8 cents, \$8,541.79; and the total amount under the contract, 227,624 cubic yards, at 13.8 cents, \$31,412.12.

The Cow Point channel has maintained its width and has deepened slightly, having a present controlling depth of over 16 feet at mean lower low water. The condition of the channel through the Hoquiam shoal is not known. The channel was never buoyed, and as far as known only one small steamer has ever been through it since it was dredged.

*Snagging.*—The work of snagging the Chehalis River began August 8 and was finished August 13, 1904. The work was done by J. W. Hall, of Montesano, Wash., who furnished appliances and men for \$30 per day. Twenty-six snags over 1 foot in diameter were removed from the bed of the stream, besides a number of smaller ones, no account of which was taken.

The work was all done between Montesano and the mouth of the Wynooche River.

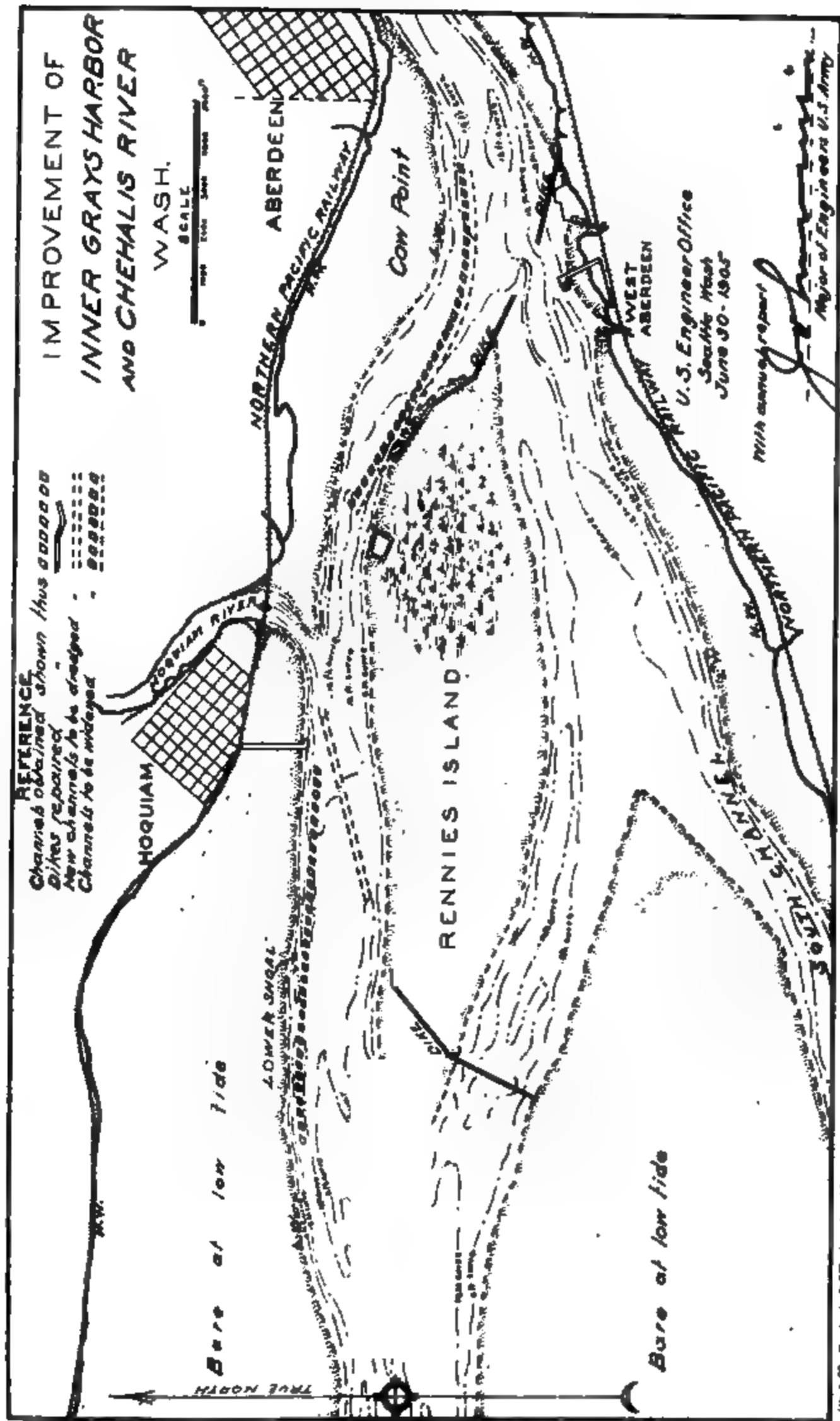
The cost of the work exclusive of inspection was \$195.90.

By the act of March 3, 1905, an appropriation of \$30,000 was made for continuing the work. At the close of the fiscal year a project for the application of this appropriation had been submitted and was under consideration by the Chief of Engineers.

The removal of snags from the Chehalis River requires continuous work.

### *Money statement.*

July 1, 1904, balance unexpended .....	\$32, 183. 97
Amount appropriated by river and harbor act approved March 3, 1905..	30, 000. 00
	<hr/> 62, 183. 97
June 30, 1905, amount expended during fiscal year:	
For works of improvement.....	\$26, 662. 25
For maintenance of improvement.....	5, 490. 98
	<hr/> 32, 153. 23
July 1, 1905, balance unexpended .....	30, 030. 74
July 1, 1905, outstanding liabilities .....	15. 00
	<hr/> 30, 015. 74
July 1, 1905, balance available .....	<hr/> <hr/> 30, 015. 74
<div style="display: flex; align-items: center;"> <div style="font-size: 3em; margin-right: 10px;">{</div> <div> Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....</div> <div style="margin-left: 20px;">20, 000. 00</div> </div>	
<div style="display: flex; align-items: center;"> <div style="font-size: 3em; margin-right: 10px;">{</div> <div>Submitted in compliance with requirements of sundry civil act of June 4, 1897.</div> </div>	





## APPROPRIATIONS.

*Improvement of Grays Harbor, inner portion, between Aberdeen and the entrance to said harbor, and Chehalis River, Washington.*

Act of July 13, 1892.....	\$50, 000
Act of August 18, 1894.....	25, 000
Act of June 13, 1902.....	50, 000
Act of March 3, 1905.....	30, 000
Total.....	155, 000

*Improvement of Chehalis River, Washington.*

August 2, 1882.....	\$3, 000	June 3, 1896.....	\$3, 000
July 5, 1884.....	2, 500	March 3, 1899.....	3, 000
August 5, 1886.....	2, 500		
August 11, 1888.....	2, 000	Total.....	19, 000
September 19, 1890.....	3, 000		

## CONTRACTS IN FORCE DURING FISCAL YEAR.

*Dredging.*

Contractor: Puget Sound Bridge and Dredging Company.  
Date of contract: October 10, 1903.  
Date of approval: October 30, 1903.  
Date of commencement: April 10, 1904.  
Date of completion: July 28, 1904.  
Supplemental articles of agreement approved February 23, 1904.  
Contract completed: July 28, 1904.

*Repairs to dikes.*

Contractor: Creech Brothers.  
Date of contract: February 24, 1904.  
Date of approval: March 15, 1904.  
Date of commencement: April 5, 1904.  
Contract time extended.  
Contract completed: September 12, 1904.

## COMMERCIAL STATISTICS.

*Exports and imports.*

[Local traffic.]

Articles.	Quantity.	Value.
	<i>Tons.</i>	
Fish, fresh.....	1, 156	\$43, 500
Flour, feed, etc.....	520	13, 520
Hay.....	410	6, 970
Live stock.....	106	7, 050
Lumber.....	109	625
Miscellaneous merchandise.....	3, 336	213, 160
Total.....	5, 637	248, 826

Three hundred and sixty-one million nine hundred and fifty-nine thousand feet board measure of saw logs, valued at \$2,352,798, were towed to the mills on Grays Harbor.

Twenty-six steam and gasoline vessels, with a total gross tonnage of 820 tons and maximum draft of 12 feet, were engaged in traffic on the river and inner harbor.

Number of passengers carried, 54,436.

W W 4.

IMPROVEMENT OF PUGET SOUND AND ITS TRIBUTARY WATERS,  
WASHINGTON.

The snag boat *Skagit* worked continuously throughout the year, with short interruptions for repairs. The streams worked on were the Skagit and its tributaries, the Snohomish, Snoqualmie, Stilaguamish, Duwamish, and Nooksak rivers; Sullivan, Swinomish, and Hat sloughs. Trips of inspection and for examination and tests of draw-bridges were also made. The work was of the usual character—removing snags and log jams and cutting trees and brush on the banks.

The river and harbor act of March 3, 1905, appropriated \$20,000 for continuing improvement and for maintenance, of which amount so much as may be necessary may be expended in the removal of Star Rock, Bellingham Bay, and of rock obstructions at the entrance of Roche Harbor.

At the close of the fiscal year a project for the application of this appropriation had been approved. The regular snagging work was in progress, and preparations were being made to make surveys of Star Rock and the rock obstructions at Roche Harbor.

Snagging work was in local charge of Capt. E. H. Jefferson, master of the snag boat *Skagit*, during the year. The following is an extract from his annual report:

The boat has been in commission steadily, and at regular intervals during the year has visited the Skagit, Snohomish, Snoqualmie, Stilaguamish, Nooksak, Duwamish, White, and Samish rivers, also the North Fork of the Skagit, Swinomish Slough, Sullivan Slough, Tom Moore Slough, Eby Slough, Hat Slough, and the Whatcom Creek waterway, clearing these streams of snag obstructions and overhanging trees, and examining the different and various bridges, log booms, and other structures.

On the Swinomish Slough the work was principally that of assisting at repairing the dikes and removing the accumulation of driftwood from them.

Additional operations consisted of minor repairs to boat, tools, etc., to keep them in good working order.

Following is a summary of the year's snagging operations:

*Number of snags and drift disposed of.*

Skagit River, including Tom Moore Slough.....	644	White River .....	20
North Fork of the Skagit River...	348	Samish River .....	9
Stilaguamish River .....	84	Swinomish Slough.....	194
Snohomish River, including Eby Slough.....	703	Sullivan Slough .....	5
Nooksak River.....	691	Hat Slough .....	29
Duwamish River .....	384	Whatcom Creek waterway.....	58
		Total .....	3, 169

Total length of snags, 72,569 feet; largest diameter, 16 feet; smallest diameter, 6 inches.

*Number of overhanging trees chopped.*

Nooksak River .....	293
Snohomish River, including Eby Slough.....	121
North Fork of Skagit River .....	7
White River .....	1
Total .....	422

Total length of trees, 12,924 feet; largest diameter, 4 feet; smallest diameter, 6 inches.



The rapid increase in the various industries connected directly and indirectly with the navigation of Puget Sound and its tributary waters, and proper safeguards for this navigation, call for an increased appropriation for the general supervision and maintenance of the navigable channels.

*Money statements.*

GENERAL IMPROVEMENT.

July 1, 1904, balance unexpended .....	\$1,437. 11
Amount appropriated by river and harbor act approved March 3, 1905..	20,000. 00
	<hr/>
	21,437. 11
June 30, 1905, amount expended during fiscal year, for works of improvement .....	2,807. 50
	<hr/>
July 1, 1905, balance unexpended .....	18,629. 61
July 1, 1905, outstanding liabilities .....	391. 20
	<hr/>
July 1, 1905, balance available .....	18,238. 41
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	<sup>a</sup> 75,000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

EMERGENCIES IN RIVERS AND HARBORS.

July 1, 1904, balance unexpended .....	\$12,000. 00
June 30, 1905, amount expended during fiscal year for maintenance of improvement .....	12,000. 00

APPROPRIATIONS.

June 14, 1880.....	\$2,500	June 3, 1896.....	\$75,000
August 2, 1882.....	20,000	March 3, 1899 .....	20,000
July 5, 1884 .....	10,000	June 13, 1902.....	35,000
August 5, 1886.....	10,000	April 28, 1904 (allotment).....	12,000
August 11, 1888.....	15,000	March 3, 1905 .....	20,000
September 19, 1890.....	12,000		
July 13, 1892 .....	15,000		
August 18, 1894.....	14,000		
		Total .....	260,500

<sup>a</sup>The removal of Star rock in Bellingham Bay and of the rock at entrance to Roche Harbor, authorized by act of March 3, 1905, will also require additional appropriation.

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## COMMERCIAL STATISTICS.

*Skagit River.*

## EXPORTS AND IMPORTS.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		Tons.	
Agricultural implements .....			86	\$8,600
Flour .....			300	15,000
Grain .....	14,989	\$374,725		
Fish, fresh .....	650	52,000	14	2,100
Fruit .....	129	32,250		
Hay .....	10,952	120,472	200	3,000
Live stock .....	150	10,000	90	6,000
Lumber .....			59	667
Potatoes .....	263	4,208	13	208
Wool .....	340	27,200		
Miscellaneous merchandise .....	2,018	106,240	3,855	353,799
Total .....	29,491	727,095	4,617	389,374

Forty-seven million nine hundred and twenty thousand feet B. M. of saw logs, 6,000 linear feet of piling, and 38,762 cords of shingle bolts were floated down the Skagit River during the year. Total value, \$428,056.

Two stern-wheel vessels of 358 total gross tonnage were regularly employed and 8 steam vessels of from 30 to 300 gross tons were irregularly employed in the traffic during the year.

*Snohomish River.*

## EXPORTS AND IMPORTS.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		Tons.	
Grain .....	600	\$15,000		
Hay .....	700	7,700	350	\$3,850
Salmon, fresh .....	142	11,360		
Lime rock .....			5,212	7,087
Lime .....			150	1,800
Lumber and products .....	6,729	31,764		
Miscellaneous merchandise .....	225	21,000	536	68,600
Total .....	8,396	86,824	6,248	81,287

Two hundred and twenty-four million feet B. M. of saw logs, 203,325 linear feet of piles and telegraph poles, and 2,150 cords of shingle bolts were floated down the river and towed to the mills during the year. Total value, \$1,478,325.

Fourteen steam vessels of from 10 to 300 gross tons and maximum draft of 7 feet were engaged at irregular times on the Snohomish River during the year.

*Stilaguamish River.*

## EXPORTS AND IMPORTS.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		Tons.	
Fish, fresh .....	125	\$10,000	7	\$1,050
Grain .....	3,358	83,950		
Hay .....	1,476	16,236	100	1,500
Lumber .....	875	5,000	30	333
Miscellaneous merchandise .....	1,439	76,430	2,203	192,173
Total .....	7,273	191,616	2,340	196,056

Thirty-seven million five hundred thousand feet B. M. of saw logs, and 14,500 cords of shingle bolts were floated down the river during the year. Total value, \$287,250.

One stern-wheel vessel is engaged regularly in towing logs and one engaged in jobbing trade on the river.

## REPORT OF MR. E. H. JEFFERSON, MASTER SNAG BOAT.

U. S. SNAG BOAT SKAGIT,  
*Mount Vernon, Wash., April 16, 1905.*

SIR: I have the honor to forward herewith commercial statistics of the water traffic of the Skagit, Snohomish, and Stilaguamish rivers for the calendar year of 1904, as instructed, with the following report on the commercial conditions and prospects of the respective localities:

The apparent general state of business in the several localities is exceedingly good at the present time. More land is being cleared than has ever been noticed before, and there is every indication of an increased acreage being brought under cultivation in the near future. New settlers are constantly heard of coming in to make their future homes in these river valleys.

The growth of the towns is noticeable and substantial. Many new buildings have recently been erected and many others repaired and improved. The farmers appear to have more spare money than formerly, which is noted by new buildings or improvements to old ones, new carriages and farming implements, and an improved grade of live stock.

There is not noticed many new manufacturing establishments. Occasionally a new shingle or lumber mill is noted, also improvements to existing ones. Manufactories, except those of lumber and shingles, are very scarce, though it is noted that a veneering and excelsior factory has recently started up at Sedro Woolley, a small plant for manufacturing cement blocks is in course of erection at Mount Vernon, and a large cement factory is being built up on the Baker River near its junction with the Skagit. New creameries are also noticed at the different towns or near by.

There are repair shops at all of the principal towns, and in some instances these have lately improved and increased their facilities.

These industries all have a general, and in some cases a direct, relation to the water traffic of the different rivers and improvement of same. Most of them have the benefit of both rail and water transportation—the rates are the same. Even those who patronize the railroads principally are vitally interested in the improvement of the rivers, realizing that it tends to keep rail rates within reasonable bounds.

There is no lack of commercial development noticed in the country tributary to any of these rivers. While the traffic does not make quite as good showing for 1904 as it did in 1903, still business conditions in most of the towns appear to be just as good. The cause of the apparent decreases I attribute to the dullness of the lumber market last year, when mills and logging camps were shut down for several months, also to the fact that rail transportation was used to a greater extent.

The foregoing conditions are applicable to no particular locality, but apply to the respective rivers and their tributaries, for which statistics accompany this.

The present water traffic of the rivers is liable to vary in amount from year to year, but it is of such a nature that the bulk of it will always exist if suitable boats are furnished to take care of it, and it would undoubtedly increase, in proportion to the growth of the country, if the improvement of the rivers and harbors is continued, by permitting boats of deeper draft and increased capacity and speed to compete with the railroads.

On the Skagit River there is one stern-wheel boat of 318 tons gross and 125 feet long, which makes three trips per week from Seattle via Stanwood and other Stilaguamish River points. One small stern-wheeler of 40 tons is reported as making three trips per week between Rockport, the end of the Great Northern Railway, and the head of upriver navigation, a distance of about 20 miles, carrying supplies and passengers to and from the mines of Mount Baker and other mining districts. Other boats to the number of seven or eight, of both the stern-wheel and propeller types, varying in gross tonnage from 30 up to 300 tons, are employed irregularly in this river and its tributaries at log towing and freighting hay and grain to Seattle and Tacoma.

On the Snohomish River there are no boats in the passenger and freight business making regular trips to or from any place, but there are 14 boats altogether engaged on this river at irregular times as jobbing boats, towing and freighting as business offers. They range in gross tonnage from 10 up to 300 tons, and in length from 30 feet to 130 feet, and are principally of the propeller type. Their maximum draft is about 7 feet and minimum 2½ feet.

During the year two new stern wheel boats of 60 and 123 tons, respectively, were built at the town of Snohomish, the larger one to ply between Everett and Snohomish and the latter to tow logs from upriver points. The former was out of business after the trolley line was finished between the two towns. The other has been practically idle since the mill at Snohomish, the owners of which built her, burned down.

On the Stilaguamish River there is no regular boat engaged except the Skagit River boat, which makes regular stops there on her trips to and from Seattle. One stern-wheeler, engaged in log towing, makes her headquarters there, and occasionally a jobbing boat makes a trip there.

The nature of the freight handled on the above-named rivers consists principally of hay, grain, general merchandise, logging, camp supplies, and machinery.

The principal difficulties now encountered by vessels is the shoalness of water on the tide flats at the entrance to the different rivers and the shoal bars and riffles at various points of the rivers proper.

Very respectfully, your obedient servant,

E. H. JEFFERSON,  
*Master Snag Boat.*

Maj. JOHN MILLIS,  
*Corps of Engineers.*

#### *Nooksak River.*

#### LOCAL TRAFFIC.

Articles.	Quantity.	Value.
	<i>Tons.</i>	
Miscellaneous merchandise .....	89	\$723

One million feet B. M. of saw logs and 29,810 cords of shingle bolts were floated down the river. Total value, \$63,489.

One stern-wheel vessel of 120 gross tons made four trips as far as Ferndale during the year.

#### REPORT OF MR. E. S. GREELY, SURVEYMAN.

BELLINGHAM, WASH., *April 5, 1905.*

SIR: I have the honor to submit herewith commercial statistics for the Nooksak River for the calendar year 1904, in accordance with your instructions.

About the 1st of December, 1904, the steamer *Edison* established a once-a-week schedule on the river, going as far up as Ferndale, but there did not appear to be enough business for the weekly trips and the schedule was discontinued in January, 1905, and the trips on the river are now made whenever there is business for them.

Since the boat commenced running on the river there have some small logging operations started. The boat tows the logs to market.

There is considerable land being cleared near the mouth of the river, in the vicinity of where the old jam used to be. Mr. M. J. Clark cleared about 60 acres on his place last year, and Mr. Zanes, who owns about 200 acres adjoining Mr. Clark's land, will establish a dairy there this year. He will clear off a large part of his land.

This land was all flooded by high water before the removal of the log jam, but can now be cultivated.

Respectfully submitted.

F. S. GREELY, *Surveyman.*

Maj. JOHN MILLIS,  
*Corps of Engineers.*

Duwamish River.

LOCAL TRAFFIC.

Articles.	Quantities.	Value.
	<i>Tons.</i>	
Brick .....	26,683	\$87,488
Coal.....	5,400	17,750
Fish, fresh .....	125	2,500
Grain and hay.....	60	1,360
Gravel and sand .....	1,000	1,000
Lumber.....	750	4,500
Miscellaneous merchandise .....	43	4,250
Total.....	34,061	118,848

Eighteen million two hundred thousand feet B. M. of saw logs and 1,508 piles and poles were floated down the river. Total value, \$114,196.  
The water traffic is carried on by small tugs and launches towing barges.

REPORT OF MR. J. M. CLAPP, ASSISTANT ENGINEER.

SEATTLE, WASH., May 12, 1905.

MAJOR: I have the honor to transmit herewith commercial statistics for Duwamish River and its tributaries for the calendar year 1904. These were compiled from information obtained from various sources, and are chiefly from data given me from persons or firms operating along these streams.

The following general report on commercial conditions and prospects for the locality is respectfully added, in compliance with your instructions of March 24, 1905:

*History of commerce.*—The Duwamish River and its tributaries—the White and Black rivers—drain a country that is about as fertile as any in western Washington and quite as extensive in area. Along their banks and extending from one side of the valley to the other numerous farms are cultivated. Among the crops raised are hops, vegetables, fruits, garden truck, and hay. This is supplemented by cattle raising and dairy products.

Factories for preserving milk, fruit, and vegetables extend as far as Kent, a thrifty town of about 2,000, located, approximately, 20 miles from Seattle, at which latter point the Duwamish finds outlet into Elliott Bay, an arm of Puget Sound.

Two large and one small brick and tile plants are located along the banks of the Duwamish, about 8 miles south of Seattle.

All of these have contributed largely to the commerce of the Duwamish River, as well as have the logging and timber industries.

Prior to the construction of the railways leading southward from Seattle practically all of the products from the farms, the forests, and the factories were brought to Seattle by way of the Duwamish River.

Since the construction of the railways, however, the farm products have ceased to be a part of this commerce for various reasons, and the settlement of the valley due to the railways has materially lessened the shipments of forest products, mills being established near by where logs are cut.

In early days the farm and forest products made up the bulk of the water commerce. Then came a period of practical disuse of the river as a commercial highway. For several years past, however, the commerce has increased from practically nothing to its present amount, as represented by the accompanying statement.

Since 1897 the city of Seattle has grown rapidly from a city estimated then at 60,000 to a population at present estimated at 150,000.

Factories are built and building in various parts of the city, and of necessity must seek suburban locations. For obvious reasons they are located where there are facilities for both rail and water transportation.

The rapid building of Seattle has rejuvenated the energy at the brickmaking plants, and the product from this source alone makes about one-third of the total tonnage of commerce for the year 1904.

The product of the forest contributed about one-half of the total tonnage for 1904, while the other one-sixth was made up of machinery, grain, hay, provisions, and miscellaneous articles.

*Settlement.*—The settlement of the valleys tributary to the Duwamish has kept a proportional pace with the growth of Seattle. Farms are being divided into smaller farms, and the forest lands and bottom lands are fast being converted into fields and gardens. It is estimated that the increase in acres cultivated and cleared during 1904 approximated 5 per cent.

Manufacturers naturally consider these factors in locating their factories, for the reason that it is desirable to have a population from which to draw for their help.

The commercial bodies of Seattle have been forced to interest themselves into finding suitable locations for new plants and for the relocation of old plants which, now being surrounded by properties so valuable that the taxes prohibit their continuance in their present locations, as well as some whose business is declared a nuisance by the city authorities.

As a solution of this the city has for a number of years been growing southward along the Duwamish River. The mud flats of Elliott Bay are being converted into business property, and wholesale houses and depots and railway terminals are locating and building along the site of these flats.

Within the last few days an iron and steel plant has been put in operation near the outlet of Duwamish River, but is separated from the deep water by the tidal flats, bare at low water.

The question has now become a serious one to find desirable locations for factories within a reasonable radius of Seattle that are economical, protected from storms, and possessing both rail and water facilities.

Salmon Bay waterway, an ideal location for manufactories, is practically all occupied by plants where vessels can reach their wharves, and here, too, the same condition of shallow waters now existing at Duwamish River is found.

The growth of Seattle has been very rapid, and now that its population is large it is found that the plants formerly engaged in business are too small and are too cramped in area to meet present and future requirements.

The Duwamish River Valley farms near the outlet of the Duwamish River offer a solution to the problem, but the requirements in the matter of deep-water facilities are a stumbling block, and if it is to be done at private expense will prove prohibitory.

*Nature of existing water traffic.*—All traffic from the Elliott Bay or Seattle Harbor to Duwamish River is suspended at low tide or shortly after the tide begins to ebb. Small tugs and gasoline launches tow barges to and from the Seattle Harbor to the river. Vessels drawing over 8 feet of water do not enter the Duwamish River at any time.

It is estimated that from two to four vessels make the trip daily from harbor to river.

*Probable effect of improvement.*—Should the lower Duwamish River be opened up to deep-water navigation, 25 to 30 feet at low water, I am satisfied that all along the line of the improvements will be located plants for manufacturing. It is a fact that the only level districts in the vicinity of Seattle are Salmon Bay Valley and the valley of the Duwamish, the former very limited in area. Flanking the sound are bluffs, and at the foot of the bluffs is a ribbon of tideland exposed to the storms and swells in Puget Sound, and from this bench of tideland the slope is almost precipitous to 100 fathoms. The Great Northern Railway Company has purchased about all the available tideland property that was to be found in a single parcel and use all of it for terminal grounds.

Lying in front of Fort Lawton and Magnolia Bluff are rather extensive tide flats exposed to storms and at times violent swells. This land was required by the United States for defensive purposes, and title was obtained free of charge to it from the State of Washington.

The situation at Seattle fairly represents the situation at every city or harbor on Puget Sound, viz, high bluffs flanking a ribbon of tide flats, which in turn flank deep-water channels. Flat or level lands are to be found only at the mouths of important streams.

It is along such valleys that manufacturing concerns whose annual output amounts to thousands of tons must locate, for the extra charge of handling if a factory were located on higher levels and away from the water facilities would simply force them out of business.

Respectfully submitted, your obedient servant,

J. M. CLAPP,  
Assistant Engineer.

Maj. JOHN MILLIS,  
Corps of Engineers.







W W 5.

IMPROVEMENT OF HARBOR AT OLYMPIA, WASHINGTON.

The object of this work was to secure a channel 250 feet wide and 12 feet deep at mean lower low water, extending from deep water in the sound to the city wharves, with a turning basin at the inner end. This was completed in August, 1903.

There were no operations during the past fiscal year, except general care of the work, inspections, and compilation of commercial statistics.

The work was under the general supervision of Mr. Eugene Ricksecker, assistant engineer.

The full amount for this improvement, as heretofore authorized by Congress, has been appropriated.

Money statement.

July 1, 1904, balance unexpended.....	\$8,120.77
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	338.56
July 1, 1905, balance unexpended .....	7,782.21
July 1, 1905, outstanding liabilities .....	360.00
July 1, 1905, balance available .....	7,422.21

APPROPRIATIONS.

July 13, 1892.....	\$35,000
August 18, 1894 .....	40,000
June 3, 1896 .....	32,000
March 3, 1899.....	15,000
June 13, 1902 .....	25,000
Total .....	147,000

COMMERCIAL STATISTICS.

Shipping.

	Arrivals.	De-partures.	Gross tonnage.
Steam vessels .....	7	7	4,865
Sail vessels .....	6	6	6,910
Total .....	13	13	11,775

Exports and imports.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		Tons.	
Beer .....	2,242	\$125,880		
Lumber and products .....	18,917	187,859		
Shellfish .....	12	1,880	520	\$22,895
Miscellaneous merchandise.....	480	2,827	1,031	25,659
Wooden pipe.....	2,000	40,000		
Total.....	18,601	307,896	1,551	48,554

Forty-six million seven hundred thousand feet, board measure, of saw logs, 2,745 cords of shingle bolts, and 2,833 linear feet of piling, valued at \$319,472, were towed to the mills and from the harbor during the year.

REPORT OF MR. EUGENE RICKSECKER, ASSISTANT ENGINEER.

OFFICE OF ASSISTANT ENGINEER,  
Tacoma, Wash., June 26, 1905.

SIR: Replying to your favor of March 24, relative to commercial statistics, respectfully submit the following general report on the commercial conditions and prospects for the port of Olympia, Thurston County, Wash.

The statistics of the water shipments of this port transmitted to your office each year for the last three years were compiled from information received from each warehouse and wharf owner, agent or lessee, on request from this office.

The majority of the responses received appear to be accurate, and usually reach this office with reasonable promptness. Trouble is yearly experienced with one party, who is so slow with returns that you were obliged to transmit your report for 1902 without statistics from Olympia. No returns for 1904 have so far been received from him, and the report for 1904 is hence incomplete. It is also noted that the values given by him are invariably \$100 per ton, be it for beer, hardware, potatoes, or what not.

For comparison the total water shipments for the port for the past three years are here given:

Year.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		Tons.	
1902 .....	164,898	\$1,251,025	43,221	\$491,550
1903 .....	129,753	574,190	80,814	270,560
1904 <sup>a</sup> .....	70,601½	489,897	47,688	185,643

<sup>a</sup> Incomplete returns. One shipper with numerous small items yet to be heard from.

Deducting the logs towed to and from the port, as follows:

Year.	Exports.			Imports.		
	Quantity.		Value.	Quantity.		Value.
	Feet.	Tons.		Feet.	Tons.	
1902 .....	67,328,000	134,656	\$475,600	13,000,000	26,200	\$113,850
1903 .....	50,000,000	100,000	350,000	33,801,500	67,603	219,940
1904 .....	26,000,000	52,000	182,000	21,695,500	43,391	128,854

Leaves for the commerce of the port, carried in vessels:

Year.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		Tons.	
1902 .....	30,242	\$775,425	17,021	\$377,700
1903 .....	29,753	224,190	13,211	50,620
1904 <sup>a</sup> .....	18,601½	307,897	4,297	56,789

<sup>a</sup> Incomplete returns. One shipper with numerous small items yet to be heard from.

A comparison of the principal commodities is as follows:

Articles.	Quantity.			Value.		
	1902.	1903.	1904.	1902.	1903.	1904.
<b>EXPORTS.</b>						
Beer .....	Tons. 2,000	Tons.	Tons. 2,242	\$200,000		\$125,880
Claims .....	90		1	9,000		168
Eggs .....	90			9,000		
Fruit .....	374			37,400		
Grain .....	320			32,000		
Groceries .....	815			81,500		
Hay .....	98			9,800		
Hides .....	75			7,500		
Lath .....	873	1,500	850	4,366	\$10,000	7,338
Lumber .....	15,317	22,583	12,647	111,398	189,000	125,983
Merchandise .....	158			15,800		
Oysters .....	85		11½	8,500		1,162

Articles.	Quantity.			Value.		
	1902.	1903.	1904.	1902.	1903.	1904.
EXPORTS—continued.						
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>			
Piles, poles, and spars.....	2,569	5,636	826	\$6,161	\$24,805	\$2,200
Pipe, wooden .....	948		2,000	94,800		40,000
Shingles .....	84	34	420	1,100	385	4,538
IMPORTS.						
Butter .....	20			2,000		
Cement .....		200	120		350	1,582
Clams .....	150		203	15,000		3,471
Groceries .....	500			50,000		
Grain .....	180			18,000		
Machinery .....	184	300	3	19,000	10,000	1,248
Merchandise .....	250	200	97	25,000	2,000	14,109
Oysters .....	125		317	12,500		19,424

The number of vessels engaged in carrying this commerce was 11, aggregating 2,522 entrances and clearances (1,261 each way), exclusive of tugs engaged in towing logs, barges, etc. Of this total 1,248 were sound passenger and freight boats and 13 were coastwise.

The vessels are grouped according to dimensions as follows:

Steamers .....	4
Steam schooners .....	2
Schooners .....	4
Bark .....	1
	<u>11</u>

Length (maximum, 283.3 feet):	
Between 100 and 200 feet .....	9
Between 200 and 300 feet .....	2
	<u>11</u>

Beam (maximum, 43 feet):	
Between 15 and 20 feet .....	1
Between 20 and 25 feet .....	2
Between 25 and 30 feet .....	1
Between 30 and 40 feet .....	4
Between 40 and 50 feet .....	3
	<u>11</u>

Draft (maximum, 24.2 feet):	
Under 5 feet .....	1
Between 5 and 10 feet .....	4
Between 10 and 15 feet .....	1
Between 15 and 20 feet .....	4
Between 20 and 25 feet .....	1
	<u>11</u>

The gross tonnage of the vessels entering from and clearing for the following points was as follows:

	Gross tons.
California, lumber .....	9,342
South America, lumber .....	2,433
Puget Sound, passenger and freight .....	330,096
	<u>341,871</u>
Total outward .....	341,871
Total inward .....	341,871
	<u>683,742</u>
Total for the port .....	683,742

The steamboat routes of the sound traffic from Olympia included in the above tonnage (330,096) are as follows:

	Gross tons.	Route.	Trips.
Capital City .....	552	Tacoma-Seattle .....	Daily except Sunday.
Greyhound .....	180	Tacoma .....	Do.
Multnomah .....	312	Tacoma-Seattle .....	Do.
City of Shelton .....	190	Shelton .....	2 daily except Sunday.

No changes have occurred since January 1, 1905, except that the *Multnomah* has been taken from the run.

The auditor of Thurston County has furnished me with the following figures relative to lands and values:

The number of acres of land assessed in 1904, exclusive of town and city lots, was 454,463 acres. (The books also show this as 411,006 acres.)

Assessed value .....	\$2,572,812
Value of improvements .....	341,312
Total .....	2,914,124

The improved land, other than town and city lots, was:

	Acres.		Acres.
1899 .....	9,870	1902 .....	11,600
1900 .....	10,602	1903 .....	12,745
1901 .....	10,602	1904 .....	9,829

The aggregate valuation of town and city lots, including improvements, was:

1899 .....	\$1,882,851	1902 .....	\$1,415,189
1900 .....	1,899,801	1903 .....	1,308,239
1901 .....	1,583,948	1904 .....	<sup>a</sup> 1,542,773

The valuation of lots unplatted and tide lots and improvements in the city of Olympia in 1904 was \$430,945.

Statistics regarding the city of Olympia, gathered from different sources, are as follows:

No record is kept and no permits issued for erection of new buildings or improvements to old ones, and no idea can be given regarding the amount of money spent in this direction. It is stated that the number is large.

The amount spent for new buildings, wharves, and machinery and betterments, exclusive of land, by the industrial establishments around the water front, was \$197,000 in 1904 and \$58,400 in the first quarter of 1905.

The city spent \$8,000 for a lift bridge across Deschutes waterway at Fourth street, completed early in January, 1905; about \$1,200 for street extensions the first half of 1905, and nothing in 1904 for that purpose.

Two industrial establishments changed management and enlarged their plants in 1904; two new ones, woodworking, started in business. No new ones thus far in 1905.

The post-office receipts and deposits at the principal bank, there being no clearing house, are as follows:

Postal receipts:		Bank deposits—Continued.	
1900 .....	\$9,490	July 1, 1901 .....	\$1,173,364
1901 .....	13,781	January 1, 1902 .....	1,122,651
1902 .....	12,931	July 1, 1902 .....	1,618,382
1903 .....	16,607	January 1, 1903 .....	1,736,611
1904 .....	15,168	July 1, 1903 .....	2,293,849
First quarter, 1905 .....	5,636	January 1, 1904 .....	1,736,543
Bank deposits:		July 1, 1904 .....	1,877,678
January 1, 1900 .....	702,427	January 1, 1905 .....	1,476,436
July 1, 1900 .....	829,382	May 15, 1905 .....	2,577,251
January 1, 1901 .....	761,215		

<sup>a</sup> Also given as \$1,573,987.

Population.

Year.	School census.	City registration.	City directory (multiplier, 2½).	United States census.
1900 .....	1,309	1,105	.....	3,863
1901 .....	1,346	699	.....	.....
1902 .....	1,450	1,119	2,708	.....
1903 .....	1,533	1,144	.....	.....
1904 .....	1,562	1,554	a 7,682	.....

a Includes Tumwater; population by United States census of 1900 was 270.

The cut of Olympia mills for 1904 is given as follows:

Lumber .....	feet..	21,500,000
Shingles .....	pieces..	79,452,000

ROADS IN THURSTON COUNTY.

*Highways.*—The county built 11 miles of gravel and dirt roads during 1904, at a cost of about \$5,000, and expended for betterments about \$33,741. For 1905 it is planned to expend about \$30,000 for this purpose.

*Electric.*—Four miles of electric road are in operation in Olympia and environs. No extensions in 1905.

The expenditure for light and power pole line in 1904 was \$3,163, and in the first quarter of 1905 it was \$400. A new power plant was completed in the spring of 1904, at a cost of \$79,000, located at tide water on Deschutes River, with a head of approximately 90 feet. Water is conducted through 1,500 feet of flume, the first 750 feet being a 10-foot box flume and the balance a 9-foot steel pipe. Two 800-horsepower 24-inch Victor turbine wheels are used. Provision has been made for doubling the capacity.

An interurban line between Olympia and Tacoma is under construction; total length between 30 and 31 miles, of which about 12 miles are in Thurston County.

*Steam.*—The Northern Pacific Railway Company operates 75.8 miles of track in Thurston County, extending from Olympia in three directions—toward Portland, Tacoma, and Grays Harbor. Olympia received 145,284 tons of freight over this road in 1904 and shipped 104,144 tons, a total of 249,428 tons handled.

Statistics show that 60 per cent of Thurston County is covered with timber, representing two-thirds of the original timber stand. The cultivated land, a little over 2 per cent (according to returns for 1904), is quite productive, particularly of fruit.

The chief product is lumber, the logging industry giving employment to a large number of men. Sandstone is extensively quarried, especially valuable by reason of accessibility. Shell fish, oysters, and clams are important products; the former, on account of excellent flavor, having attained considerable notoriety under the name of "Olympia," is now being cultivated and receives protection from the State. The latter, pretty generally distributed over the sound country, must soon be protected to prevent extermination.

The products developed at the port are lumber, beer, shingles, and wood pipe, arranged in order of value of output for 1904, beer pushing lumber closely for first place. The lumber shipment for 1904 was little more than half that for 1903, but nearly equaled that of 1902, while for the first five months of 1905 it nearly equals the year of 1902 (14,760 tons). The price, according to the returns for cargo shipments, advanced steadily during the past three years, while at other ports the price for 1904 and 1902 was practically the same and greater than for 1903.

The apparent general state of business is good.

Lumbermen and woodworkers say the outlook is excellent; very busy. Apparent prospective increase, 25 per cent.

Shingle men, however, say their business is dull; market overstocked. Most mills shut down yearly about this time and the condition is thought to be not unusual.

Bankers say the prospects are very encouraging, and while advising business men to enlarge and reach out for new business, conservatively caution against use of borrowed capital for that purpose.

Olympia is situated at the head of Puget Sound; not at the greatest distance from the ocean, but at the most southern point of the sound, on gently sloping ground, at head of Budd Inlet and mouth of Deschutes River. The harbor is flanked by the usual sound bluffs, though these are not as high here as at most of the towns around

the sound. Deschutes River is now an unimportant stream as far as navigation is concerned, advertised for its scenic Tumwater Falls, its use in the manufacture of beer, and development of power for light and manufacturing purposes. Its work, encroaching on the sound by sedimentary deposit, has been well done from nature's standpoint, the tidal flats extending out into the sound for a distance of 4 miles to 18 feet at low water, 2 miles beyond the business section of Olympia. To enable light-draft sound passenger and freight boats to reach Olympia a wharf 4,800 feet long was built across these flats toward deep water. This was maintained at great expense for a number of years until the General Government began improving the harbor, June, 1893. This project called for dredging a channel 250 feet wide and 12 feet deep at mean low water (8.8 feet at mean of few selected lowest low waters or 8.3 feet at extreme low, lowest observed May, 1874), with a turning basin at inner end. The project was completed August, 1903.

In the meantime harbor lines established by the State of Washington had been approved by the War Department. These lines are so located as to form in reality two main waterways, a narrow east one and a wide west one, extending across the flats to the city from about low-water line, a narrow-channeled branch extending from the west one up Deschutes River about 2 miles. The eastern fourth of this west branch and the extension seaward, a channel practically parallel to the old long wharf and a straight course to the steamboat landings, was improved by the Government. For some unknown reason little attempt was made by the owners of adjacent property to utilize the excavated material for reclaiming the flats, as has been done at other points on the sound; neither has any advantage been taken of the mile of dredged channel by location of industries along its one available side, the industries along the water front being grouped to-day precisely as they were before the improvement was begun—that is, group (a) near the head of the east channel of waterway and group (b) along the west side of and near the outer end of the west one—the general shipments made from steamboat landing at wharf and warehouses being transferred from end of old long wharf to inner end of improved channel.

Lack of water facilities therefore can hardly be said to be responsible for lack of industrial development. Industries in group (a) do not ship by water (except possibly small quantities on sound boats), and apparently would not utilize water facilities to any appreciable extent. A recently enlarged sawmill in group (b) has for several years been shipping its products coastwise and to South American ports by lightering to vessels anchored in deep water. It is believed that the commerce of the port will be materially benefited by improving the harbor in such a manner as will enable vessels to reach this mill and load without having to pay charges for lighterage and additional handling. Also, the proprietors of one of the new industries in this vicinity state that with water transportation at their door they will be able to greatly increase their business by reason of cheaper freight rates, competition being too keen to allow them to pay rail charges.

It is worth noting that 14 per cent of the imports for 1904 as herein reported were lightered to the head of Deschutes waterway on scows drawing from 4 to 6 feet of water, towed by launches; that an additional 27 per cent of the imports were carried by electric car line to the same point from the Olympia docks, and that 41 per cent of the exports were similarly transported to the docks from this point; that is, over 40 per cent of the business of the port emanated from an industry at the head of Deschutes waterway with inadequate water facilities.

Consideration of the type and size of vessels entering this harbor (see p. 2523) leads to the conclusion that while the present channel is ample for sound traffic, it might be deepened somewhat for prospective traffic and for the present type of coasting vessels that come to load lumber, and incidentally occasionally wish to reach the city docks, and that the dredging of a channel along the western side of the harbor is an improvement that is of prime importance in the development of the commerce of this port.

Budd Inlet is quite shallow as compared with the water of the sound, the depth for a distance of  $3\frac{1}{2}$  miles from Olympia being less than 25 feet. The class of vessels that will seek charters in this harbor is therefore limited.

There are no dangers to navigation in this harbor and no difficulties of great importance. Vessels entering and clearing, however, are obliged to make a detour around the flats opposite Priest Point in order to enter the improved channel. The straightening of this portion of the route would facilitate navigation and warrants at least an examination.

Very respectfully,

EUGENE RICKSECKER,  
*Assistant Engineer.*

Maj. JOHN MILLIS,  
*Corps of Engineers.*



## W W 6.

## IMPROVEMENT OF TACOMA HARBOR, WASHINGTON.

The approved plan for this work contemplated excavating the city waterway from deep water in Commencement Bay to Eleventh street to a depth of 25 feet, from Eleventh street to Fourteenth street to a depth of 18 feet, and from Fourteenth street to the south end of waterway to a depth of 15 feet at extreme low water.

Dredging in the city waterway was active and continuous from the beginning of the year until its completion in April, 1905, except for occasional interruptions caused by slight accidents. The dredging was done mainly by the contractor's seagoing hydraulic dredger *Pacific* and the dredger *Seattle*.

The total amount of material removed during the year was 1,155,608 cubic yards. The total amount of material removed and paid for under the contract was 2,099,608 cubic yards, at 6.44 cents per cubic yard, amounting to \$135,214.76.

The full amount of the improvement of the city waterway, as authorized by Congress, has been appropriated.

The river and harbor act of March 3, 1905, provides as follows:

Improving Tacoma Harbor, Washington: For improvement of the Puyallup waterway by dredging a channel five hundred feet in width and three thousand six hundred and fifty feet in length from its northern end, and to a depth of twenty-eight feet at extreme low water, in accordance with the report submitted in House Document Numbered Five hundred and twenty, Fifty-eighth Congress, second session, forty thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said project, to be paid for as appropriations may from time to time be made by law, not to exceed, in the aggregate, two hundred thousand dollars exclusive of the amounts herein appropriated: *Provided further*, That the United States shall be under no expense for the construction of bulkheads, groins, or filling, and before any portion of this appropriation shall be expended, or any contract let for this improvement, suitable provision shall be made, to be approved by the Secretary of War, that in the prosecution and completion of the work of dredging said channel the cost and charges for the construction of necessary bulkheads and groins, or for necessary filling, will be furnished upon the demand of the United States engineer in charge, and the design and location of said bulkheads and groins shall be subject to his supervision, and all necessary filling shall be made in accordance with the plans and specifications furnished by said engineer: *And provided further*, That no expenditure shall be made under this appropriation unless provision satisfactory to the Secretary of War is made for the permanent maintenance of said project, when completed, without expense to the United States.

At the close of the year a project had been approved for the application of the above appropriation, and negotiations were in progress between the local authorities and owners of property adjacent to the Puyallup waterway to secure compliance with the conditions of the appropriation act.

The work was in charge of Mr. Eugene Ricksecker, assistant engineer, during the year. The following are extracts from his annual report:

The conditions of work on July 1, 1904, were as follows: All provisions in the appropriation act had been complied with. A contract had been let, after due advertisement, to Mr. Raymond A. Perry, the lowest bidder, at 6.44 cents per cubic yard, under date of February 24, 1903.

Work began as required, on June 4, 1903, with a dipper dredger, pending the completion of a large hydraulic seagoing dredger, the *Pacific*. The latter entered commission September 1, 1903.

Date of completion of contract, June 4, 1904; time waived by Chief of Engineers, May 24, 1904.

On June 24, 1904, the hydraulic dredger *Seattle* was added to the plant. The material had been removed from the waterway north of Eleventh street, from a 100-foot channel between Eleventh and Fourteenth streets, from the turning basin at Fifteenth street, from the 100-foot channel south of Fourteenth street (station 48 + 20) to station 75 + 80, about 575 feet from the south end of waterway, and the channel between Eleventh and Fourteenth streets was being widened. On July 1, 1904, 944,000 cubic yards of material had been removed.

Both dredgers worked continuously, except while undergoing repairs, until February 12, 1905, when the *Pacific* spent fourteen days dredging a log pond adjacent to the waterway for the Northern Pacific Railway Company. No unusual accidents occurred. Dredging operations ceased by the *Pacific* on March 29 and by the *Seattle* on April 15, on completion of the work as provided in the specifications and act of Congress, all material in the city waterway having been removed to the required depths and slopes except a small quantity left around the piers of the two draw-bridges, under the trestle bents of the Fourteenth Street Bridge, in front of a large brick-refuse burner, and at several points on the slope outside the waterway where structures stand.

On petition of adjacent property holders, in which you concurred, approved by Chief of Engineers August 11, 1904, the south 50 feet of the waterway, ending in an acute angle, was left undredged for reasons that are obvious. The quantity of material in this curtailed portion is 2,622 cubic yards.

The general dimensions of the waterway are as follows:

Section 1. Deep water to Eleventh street (station 3 + 70 to 36 + 20), length on center line 3,320 feet, width 580 feet; dredged to 25 feet at extreme low water.

Section 2. Eleventh to Fourteenth streets (station 36 + 20 to 48 + 20), length 1,200 feet, width 580 feet for 380 feet tapering to 490 feet; dredged to 18 feet at extreme low water.

Section 3. Fourteenth to Twenty-third streets (station 48 + 20 to 81 + 55), length 3,335 feet, width tapering to 270 feet in 2,560, with basin 335 feet wide for the next 560 feet, tapering to nothing in the next 215 feet; dredged to 15 feet at extreme low water.

The quantity of material removed and paid for was as follows:

	Cu. yards.	Cu. yards.
Section 1 .....	588, 558	
Section 2 .....	535, 962	
Section 3 .....	983, 870	
	<hr/>	
Total in waterway.....		2, 108, 390
Quantity in curtailed portion.....	2, 622	
Quantity left around bridges, etc .....	6, 160	
	<hr/>	<hr/>
		8, 782
		<hr/>
Total quantity removed and paid for.....		2, 099, 608

In section 1 the material proved to be principally sand mixed with sufficient clay to hold it up. One short streak of hard clay was found. The rock and brush from old bulkhead and groins, afterwards removed by clam-shell dredger, caused much less trouble than anticipated.

In section 2 the material proved to be principally sand mixed with sufficient clay generally to hold it together. The west half of waterway having been used as a dump and storage for logs, much bark and refuse was encountered, giving considerable trouble. Rock and brush used in an old bulkhead placed too close to edge of waterway gave trouble, especially the rock, by rolling down on the cutter. Much of this was removed by a clam-shell dredger. An old bulkhead of brush near the Fourteenth Street Bridge and remains of a cofferdam at the pivot pier also caused delay.

In section 3, from station 48 + 20 to 68, the material was mostly very fine sand. At the latter point a bed of coarse gravel appeared at grade, gradually increasing in depth until at about station 73 it was 3 feet above grade and at station 77 about 17 feet. Pumping this material proved to be extremely hard on the pumps and pipe. The *Pacific* gave it up and sublet 300,000 cubic yards at this end of the waterway to the *Seattle* at the same figure paid her by the Government. The *Seattle's* discharge being several inches smaller than that of the *Pacific*, she managed to handle the material, though at a very slow rate and at the expense of several pumps.

Much mill refuse spread out over the waterway was removed, but a much larger quantity undermined by the cutter slid back under the machines and still remains. While it was a source of trouble on the first cut, it was quite expensive on the second

cut and cleanup, when the cutter practically skimmed along the bottom. For this reason the practice latterly followed was to remove the material considerably below the grade to reduce the chances of having to work over the ground again.

Some 5,000 cubic yards of mill refuse lying above mean tide—backing for old bulkheads, placed by the mills within the waterway some years ago—was removed by hand.

\* \* \* \* \*

About 24,000 cubic yards of material was dumped in deep water of the sound. The remainder was used in bringing the low ground around the waterway, mainly on the east side, to grade of about 4 feet above extreme high water, elevation 22 on United States engineer datum. The material was retained on the east side, where the water ran off over a long circuitous route to the sound, by bulkheads composed generally of three rows of piling backed with planks placed in step shape to conform to slope of 1 on 1½, the face afterwards enrocked with one-man stone to depth of about 2 feet. On the west side, where there was no way to care for the overflow other than allowing it to immediately return to the waterway, generally and effectively, over the top of bulkhead, brush was used without plank, the required height obtained by adding small quantities of brush as fast as the material deposited.

Most of the material was deposited on lands of the Northern Pacific Railroad Company, that company building the bulkheads and spreading the material. The contractor delivered the material where desired for 3 cents per cubic yard at the end of discharge pipe. The total cost to the railroad company was \$136,058, the cost being much greater than if the time consumed in completing the contract had been shorter, for the reason that they were obliged to keep their force on hand day and night, whether the dredger worked or not.

The contractor received for his work:

From the Government, 2,099,608 cubic yards, at 6.44 cents.....	\$135, 214. 76
From Northern Pacific Railroad Company, 2,047,600 cubic yards, at 3 cents .....	61, 428. 00
From Tacoma Eastern Railroad Company, 19,562 cubic yards, at 5 cents. ....	978. 10
Total .....	197, 620. 86

Some Tacoma Eastern land was filled without charge, that company not caring whether it was filled or not, so their fill probably cost them an average of 3 cents per cubic yard.

Some years ago the Northern Pacific Railroad Company dredged a channel along both sides of the waterway from deep water to Eleventh street, leaving the central portion undredged. Approximately 500,000 cubic yards of material was removed and used in filling adjacent tide lands on the east (area A), the surface of which was left uneven. Under this contract this area was leveled by filling the low places.

The areas filled were as follows:

	Area filled.	Average fill.
	Acres.	Feet.
Area A, north of Eleventh street .....	33.0	3.0
Area B, Eleventh street to Wheeler Osgood waterway .....	22.5	9.0
Area C, Wheeler Osgood waterway to Fourteenth street .....	30.0	8.0
Area D, Fourteenth to Twenty-third street .....	78.5	9.0
Area E, Fifteenth to Twentieth street, west side .....	9.0	7.5
Area F, South end waterway .....	6.0	5.5
Area east of D (overflow from D) .....	39.0	(a)

a Partly filled.

The length of discharge pipe in making the fill varied from about 400 to 3,800 feet. The average length for the *Pacific* was probably 2,300 feet and for the *Seattle* 1,300 feet. The top of fill as completed is unusually even, practically level, and reflects great credit on the foreman in charge of that work.

The first vessel to use the waterway was the four-masted sailing ship *Pegasus*, that passed through both drawbridges on April 3, an event that was joyfully celebrated. The first large steam vessel was the *Eureka*, that passed up on April 5.

The improvement has been too recently completed to exert any influence on the commerce of the port as yet. A number of new industries have, however, located themselves along the upper end of the waterway, and many new wharves and buildings have already been erected.

\* \* \* \* \*

2530 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

There being some question whether or not obstructions had been removed to grade by the dredgers, a cheaply constructed "sweep" was made and portions of the waterway examined. Nothing of a nature to endanger traffic was found.

Some attention has been given the Puyallup waterway, and a report containing suggestions for draft of specifications was forwarded you. A number of parties interested in the improvement have discussed the matter in this office, and I understand that favorable action is soon expected from the last owner of adjacent property relative to erection of the required bulkheads. Proper action by the city of Tacoma relative to maintenance of channel when dredged awaits action of the above party.

*Money statement.*

July 1, 1904, balance unexpended .....	\$114,423.34
Amount appropriated by river and harbor act approved March 3, 1905 ..	40,000.00
	<hr/>
	154,423.34
June 30, 1905, amount expended during fiscal year, for works of improvement .....	89,269.55
	<hr/>
July 1, 1905, balance unexpended .....	65,153.79
July 1, 1905, outstanding liabilities .....	185.65
	<hr/>
July 1, 1905, balance available .....	64,968.14
	<hr/>
Amount (estimated) required for completion of existing project .....	200,000.00
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	200,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATIONS.

*City waterway.*

June 13, 1902 .....	\$75,000
March 3, 1903 .....	100,000
	<hr/>
	175,000

*Puyallup waterway.*

March 3, 1905 .....	40,000
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CONTRACT IN FORCE DURING FISCAL YEAR.

Contractor: Raymond A. Perry.  
Date of contract: February 24, 1903.  
Date of approval: March 30, 1903.  
Date of commencement: June 4, 1903.  
Date of completion: June 4, 1904.  
Time of completion waived by authority of the Chief of Engineers May 24, 1904.  
Contract completed: April 15, 1905.

COMMERCIAL STATISTICS.

*Shipping.*

	Steam vessels.	Sail vessels.	Total gross tonnage.
Arrivals .....	810	484	2,210,959
Departures .....	810	487	2,230,252

Maximum draft, 32 feet 7 inches.

*Exports and imports.*

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>	
Beer .....	2, 281	\$145, 984		
Cement .....			11, 137	\$144, 998
Coal .....	417, 430	1, 252, 390		
Cotton .....	11, 215	2, 243, 000		
Fish, fresh and canned .....	4, 399	822, 000	5, 100	464, 290
Flour .....	101, 633	3, 941, 949		
Grain .....	36, 631	967, 332	3, 384	91, 880
Hay .....	3, 031	77, 563	1, 200	15, 300
Hemp .....			13, 835	2, 075, 250
Lime and limestone .....	10	110	25, 810	204, 112
Live stock .....	570	44, 400		
Lumber and products .....	155, 145	1, 413, 481		
Logs and piling .....	103, 572	810, 434	257, 791	850, 712
Machinery .....	5, 011	751, 650	273	40, 700
Matting .....	123	24, 600	24, 864	4, 972, 800
Miscellaneous merchandise .....	79, 017	11, 931, 289	109, 796	5, 412, 277
Ore .....			65, 708	3, 592, 892
Products of smelter .....	12, 086	4, 300, 053		
Steel rails .....	17, 400	556, 800		
Sugar .....	63	6, 300	7, 244	724, 400
Silk .....			265	1, 580, 000
Tea .....	266	53, 200	16, 261	2, 500, 000
Tin .....	414	41, 400	41	4, 100
Tobacco .....	4, 984	996, 800		
Wheat .....	61, 084	1, 672, 306		
<b>Total .....</b>	<b>1, 018, 865</b>	<b>31, 043, 061</b>	<b>542, 709</b>	<b>22, 683, 711</b>

## REPORT OF MR. EUGENE RICKSECKER, ASSISTANT ENGINEER.

OFFICE OF ASSISTANT ENGINEER,  
Tacoma, Wash., June 17, 1905.

SIR: Replying to your letter of March 24, relative to commercial statistics, respectfully submit the following general report on the commercial conditions and prospects for the port of Tacoma, Pierce County, Wash.

The data yearly transmitted to your office for the past three years relative to the water shipments for this port were compiled from information received from each warehouse and wharf owner, agent, or lessee, on request from this office. This information includes the quantity and value of the shipments that pass over each wharf. It is sometimes compiled hurriedly from shipping manifests containing meager information, the value inserted by the clerk being oftentimes a guess, so that the chance for occurrence of error is large.

The figures sent for years 1902 and 1903 were used by this office without question, except for correction of such errors as were readily observed. This year more time was spent in analyzing the returns, with result that several blunders in the figures as furnished were found. These led to the determination of the unit prices (dividing the reported values by the quantities) not only for the year 1904, but for the two previous years. In this way discrepancies were found in all three years. The parties furnishing discrepant information were consulted, and the returns in most instances could be corrected. In some cases it was found that the tons reported were based on ship's measurement instead of actual weight. Large errors only can be detected in this way. Small variations in unit prices are to be expected, and while they may indicate rise or fall in the price of the article, are just as likely to result from the rough method of getting at either the weight, the value, or both.

For comparison the total commerce, as corrected for the past three years, is shown as follows:

Year.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>	
1902 .....	1, 271, 182	\$37, 291, 343	522, 574	\$18, 578, 374
1903 .....	1, 437, 264	33, 165, 833	624, 142	25, 934, 828
1904 .....	1, 041, 365	31, 045, 061	543, 259	22, 711, 311



2532 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Deducting the logs towed to and from the port, as follows:

Year.	Exports.			Imports.		
	Quantity.		Value.	Quantity.		Value.
	<i>Feet.</i>	<i>Tons.</i>		<i>Feet.</i>	<i>Tons.</i>	
1902 .....	23,600,000	47,206	\$177,944	170,567,500	341,135	\$1,264,899
1903 .....	94,087,500	188,175	560,153	194,247,500	388,495	1,438,264
1904 .....	50,925,000	101,850	805,955	128,708,000	257,416	849,962

Leaves for the commerce of the port carried in vessels for—

Year.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>	
1902 .....	1,228,982	\$37,113,899	181,439	\$17,313,475
1903 .....	1,249,089	32,605,680	235,647	24,496,564
1904 .....	989,515	30,739,106	285,843	21,861,349

A comparison of the principal commodities is as follows:

Articles.	Quantity.			Value.		
	1902.	1903.	1904.	1902.	1903.	1904.
<b>EXPORTS.</b>						
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>			
Coal.....	371,825	690,748	417,430	\$1,209,200	\$2,018,299	\$1,252,390
Cotton .....	29,220	18,860	11,215	5,844,000	3,772,000	2,243,000
Fish.....	7,052	952	4,395	637,400	96,033	319,500
Flour .....	124,228	130,056	101,633	3,857,760	4,764,907	3,941,949
Grain .....	838,650	139,364	94,281	7,672,150	3,556,555	2,502,048
Hay.....	8,052	9,753	3,031	182,950	197,655	77,583
Hides .....	576	108	59	115,200	15,120	5,900
Lumber.....	252,521	145,118	137,063	2,379,607	1,198,832	1,298,770
Meats .....	659	1,760	3,837	131,800	367,687	711,920
Merchandise.....	18,154	50,243	46,052	1,815,400	5,024,150	4,605,000
Miscellaneous.....	5,993	6,939	28,818	497,243	475,234	2,703,644
Nails.....	185	1,161	8,960	18,500	69,930	448,000
Paper .....	1,010	3,001	70	60,600	419,216	2,800
Peanuts.....	106	4	547	6,360	30	21,880
Product of smelter.....	11,177	13,430	12,086	4,202,980	5,193,668	4,300,053
Rice.....	186	100	76	3,720	6,020	4,560
Sheeting .....	11,588	3,887	5,823	5,214,600	1,554,800	2,562,100
Shingles .....	133	436	465	1,766	5,617	5,581
Tin .....	431	656	414	43,100	65,600	41,400
Tobacco.....	6,276	7,294	4,984	1,569,000	1,794,900	996,800
<b>IMPORTS.</b>						
Brick .....	2,148	3,256	10,672	7,832	23,965	131,184
Butter .....	60	3	None.	24,000	1,200	.....
Cement .....	7,628	10,468	11,687	152,560	130,852	144,998
Fish.....	6,078	3,785	2,710	585,700	312,420	117,400
Fish, salmon.....	3,559	2,423	2,377	435,050	216,048	255,800
Fruit.....	987	1,100	322	61,920	33,000	24,150
Groceries .....	7,122	1,108	1,291	712,200	110,800	129,100
Hemp.....	1,020	11,073	13,835	212,290	2,103,870	2,073,250
Iron and ironwork.....	1,068	8,157	6,544	55,150	202,200	188,566
Lime and limestone .....	10,433	27,839	25,810	34,079	204,842	204,112
Matting.....	26,132	26,800	24,864	5,226,400	5,280,000	4,972,800
Merchandise.....	19,626	54,484	32,228	1,409,514	5,108,150	3,195,295
Miscellaneous.....	13,121	8,519	5,456	1,323,240	851,900	551,832
Ore.....	45,972	54,868	65,708	2,262,059	4,527,117	3,592,892
Rice.....	1,476	1,868	2,270	29,520	112,080	136,200
Silk .....	.....	286	265	.....	1,430,000	1,590,000
Straw braid .....	1,515	1,035	635	1,212,000	828,000	508,000
Sugar .....	8,360	4,151	7,244	836,000	415,100	724,000
Tea .....	8,496	11,016	16,261	1,699,200	2,203,200	2,500,000

The commerce for 1904 is distributed in the port as follows:

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
City waterway, north of Eleventh street:	<i>Tons.</i>		<i>Tons.</i>	
Brick .....	58	\$159	3,717	\$111,510
Cement .....			10,737	128,810
Fish .....	180	15,000	2,942	240,000
Flour .....	478	15,700		
Grain .....	78,050	2,074,586		
Hay, feed, etc. ....	8,742	164,012	69,368	11,700
Iron .....			5,654	170,000
Merchandise .....	38,850	8,885,000	28,716	2,855,000
Miscellaneous .....	5,427	732,325		
Total .....	182,750	6,886,782	121,134	3,517,020
City waterway, between Eleventh and Fourteenth streets:				
Logs and cord wood .....	64,839	194,517	81,500	92,500
City waterway, south of Fourteenth street:				
Asphalt .....			600	9,600
Brick .....	50	160	6,955	19,674
Cement .....			550	6,188
Grain .....	50	1,200	50	1,420
Gravel and sand .....	415	208	39,270	21,220
Hay, feed, etc. ....	45	835	3,900	92,700
Iron and ironwork .....	242	48,373	855	17,166
Lime .....	10	110	2,509	25,597
Lumber, logs, and piles .....	39,251	181,566	59,745	161,046
Miscellaneous .....	147	995	217	2,190
Fish .....	60	2,400		
Total .....	40,270	185,847	114,660	356,801
Total, city waterway .....	237,859	7,267,146	267,294	3,966,321
Puyallup waterway:				
Lath .....	3,600	20,000		
Logs .....			18,000	54,000
Lumber .....	4,000	58,500	2,000	12,000
Total .....	7,600	73,500	20,000	66,000
Hylebos waterway:				
Boxes .....	2,500	30,400		
Logs .....			9,400	27,750
Lumber .....	2,800	16,500		
Total .....	5,300	46,900	9,400	27,750

The number of vessels engaged in carrying this commerce was 256, aggregating 7,220 entrances and 7,223 clearances, a total of 14,443 exclusive of tugs engaged in towing logs, barges, etc. Of this total, 11,852 (entrances and clearances) were sound passengers and freight boats.

The vessels are grouped according to dimensions, as follows:

Length (maximum, 489.5 feet):

Between 30 and 40 feet .....	2
Between 40 and 60 feet .....	5
Between 60 and 100 feet .....	21
Between 100 and 200 feet .....	89
Between 200 and 300 feet .....	70
Between 300 and 400 feet .....	43
Between 400 and 490 feet .....	23

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Beam (maximum, 58.3 feet):

Between 5 and 10 feet .....	1
Between 10 and 15 feet .....	4
Between 15 and 20 feet .....	14
Between 20 and 25 feet .....	22
Between 25 and 30 feet .....	10
Between 30 and 40 feet .....	101
Between 40 and 60 feet .....	101

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Draft (maximum, 32.7 feet):

Under 5 feet .....	8
Between 5 and 10 feet .....	38
Between 10 and 15 feet .....	49
Between 15 and 20 feet .....	35
Between 20 and 25 feet .....	76
Between 25 and 30 feet .....	27
Between 30 and 40 feet .....	20

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Two United States Government boats and 1 launch omitted.  
The gross tonnage of the vessels entering from and clearing for the following points is as follows:

	Gross tons.
Central and South America .....	34, 708
Hawaii, Philippines, Japan, China, and Samoa .....	237, 464
United Kingdom .....	73, 034
British Columbia .....	300, 218
Germany .....	44, 489
Australia .....	22, 882
South Africa .....	4, 314
New York and Europe via Orient .....	98, 415
New York and Honolulu .....	81, 490
Mexico .....	64, 950
Coastwise, including Alaska .....	1, 250, 343
Puget Sound, passenger and freight .....	1, 289, 448
Total outward .....	3, 501, 755
Total inward .....	3, 492, 462
Grand total .....	6, 994, 217

The regular routes from Tacoma for 1904 were as follows:  
Yokohama, Kobé, Hongkong, Liverpool, London, and Glasgow, 13 vessels, one every twenty-eight days, round trip in eight months.  
Yokohama, Kobé, Hongkong, and Manila, 5 vessels, each 4½ round trips per year, one every twenty to twenty-five days.  
San Francisco, South American ports, Genoa, London, Antwerp, and Hamburg, one every month.  
San Francisco, 3 vessels, one every five days.  
San Francisco, 2 vessels, each weekly.  
Honolulu, 3 vessels, one every month.  
Alaska, 7 vessels, one about every two and one-half days. Also during summer season one about every five days to St. Michael and Nome.  
British Columbia, three weekly.  
The regular routes, sound traffic for 1904, are as follows:

Vessel.	Gross tons.	Route.	Trips.
Blanche .....	98	Seattle, via west passage .....	Daily, except Sunday.
Crest .....	99	Glg harbor, Wash .....	8 daily, except Sunday.
Defiance .....	171	Seattle, via east passage .....	Daily, except Sunday.
Flyer .....	427	Seattle .....	4 daily.
Greyhound .....	180	Olympia, Wash .....	2 daily, except Sunday.
Multnomah .....	312	Seattle and Olympia .....	Daily, except Sunday.
Norwood .....	92	Quartermaster Harbor .....	2 daily, except Sunday.
Rapid Transit .....	192	Roche Harbor .....	3 weekly.
T. C. Reed .....	237	Seattle .....	Daily, except Sunday.
Tyconda .....	186	Henderson Bay, Wash .....	Do.
Tyrus .....	174	North Bay, Wash .....	3 daily, except Sunday.
Utopia .....	423	Bellingham, Wash .....	3 weekly.

The *Flyer* carries passengers only. All others carry freight and passengers. Since January 1, 1905, the following boats have been added to this list:

Vessel.	Gross tons.	Route.	Trips.
Burton (in place of Norwood)...	90	Quartermaster Harbor .....	3 dally.
Dove (formerly Typhoon).	71	Seattle .....	Daily.
T.W. Lake (in place of T.C. Reed).	191	.....do .....	Daily, except Sunday.
Crystal .....	34	Fox Island and Hales Passage ...	Do.

Two shipyards are located here, one on the outer harbor, restricted in area to the narrow rim of level land between bluff and deep water, and the other in the Puyallup waterway. The latter is not now in operation, due largely to the fact that the firm experienced great delay, trouble, and expense in getting their last vessel, the *Jefferson*, over the bar at the mouth of the waterway.  
The boats built during 1904 were as follows:

Vessel.	General class.	Length.	Beam.	Gross tonnage.	Maximum draft.
		<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>
Jefferson .....	Steamer .....	207	40.0	1,615	18.0
Zapora <sup>a</sup> .....	.....do .....	162	25.6	289	13.9

<sup>a</sup> Launched November, 1904; entered commission June, 1905.

Since then the *Burton* was launched (March) and entered commission in May. She is a steamer also; length, 92.8 feet; beam, 20 feet; gross tonnage, 90; maximum draft, 6.1 feet.  
The auditor of Pierce County has furnished me with the figures in the two following tables relating to lands in this county.  
The number of acres of land assessed in 1904, exclusive of town and city lots, was 625,291 acres.

Assessed value.....	\$5, 041, 627
Value of improvements .....	1, 256, 840
Total .....	6, 298, 467

Average value of land exclusive of improvements was \$8.06 per acre.  
The improved land other than town and city lots was:

	Acres.		Acres.
1899 .....	20, 614	1902 .....	20, 392
1900 .....	20, 324	1903 .....	21, 122
1901 .....	20, 329	1904 .....	22, 384

The aggregate valuation of town and city lots, including improvements in Pierce County, Wash., was:

1899 .....	\$19, 613, 668	1902 .....	\$17, 915, 660
1900 .....	17, 541, 501	1903 .....	17, 995, 906
1901 .....	16, 541, 715	1904 .....	19, 427, 621

The valuation of lots, unplatted and tide lots, and improvements in the city of Tacoma in 1904 was \$19,509,589.  
The building inspector of the city of Tacoma states that the number and value of permits given for new buildings and improvements was:

Year.	Number.	Value.
1900 .....	487	\$505, 601
1901 .....	696	827, 186
1902 .....	891	1, 129, 598
1903 .....	1, 314	1, 700, 384
1904 .....	1, 527	1, 911, 061
First quarter of 1905.....	887	511, 478

These figures I have segregated as follows for the year 1904 and first quarter 1905:

*Value of commercial buildings erected and improvements to existing structures.*

	1904.	First quarter 1905.
Puyallup waterway.....	\$700	.....
City waterway.....	41,080	\$20,530
Outer harbor.....	31,000	250
Inland.....	72,780	20,780
	209,040	23,900
Total.....	281,820	44,650

The values in above two tables show the growth relatively, for the reason that they include structures but not machinery and equipment; then, too, applicants for permits invariably name a figure under the actual cost to avoid possible assessment at actual value.

The following table shows the actual cost of new buildings, wharves, and machinery, and betterments, exclusive of land values, as obtained by this office from industrial firms around the harbor:

	1904.	First quarter, 1905.
Hylebos waterway.....	\$40,000	\$7,000
Puyallup waterway.....	25,700	10,000
City waterway <sup>a</sup> .....	114,150	31,740
Outer harbor.....	458,270	181,025
Total, exclusive of inland.....	638,120	229,765

<sup>a</sup> Does not include amount spent in reclaiming tidelands, bulkheads, and filling; preparation of land for commercial uses.

In addition to above the city spent \$14,840 for bridge across Puyallup waterway in 1904, and the county spent \$16,283 for road to Hylebos waterway in 1904 and \$4,000 in first quarter of 1905.

New manufacturing industries established as follows: In 1903, 14; in 1904, 13; in 1905 (five months), 11.

The city engineer has furnished the following statistics relating to the improvements carried on by the city since January 1, 1904. No data for previous years could be obtained for the stated reason that the records were so incomplete and badly tangled that it would be next to impossible to get it out.

	Miles.		Cost. <sup>a</sup>	
	1904.	First quarter, 1905.	1904.	First quarter, 1905.
Grading roadways.....	4.5	1.1	.....	.....
Planking roadways.....	.8	.2	.....	.....
Macadam pavement.....	.3	.1	.....	.....
Asphalt pavement.....	.6	.1	.....	.....
Brick pavement.....	2.2	.....	.....	.....
Concrete walk.....	69.6	17.4	.....	.....
Wooden walks.....	38.3	9.5	.....	.....
Total.....	116.3	28.4	\$437,634	\$109,409
Sanitary sewer mains.....	7.7	1.9	49,194	12,299
Commercial light service.....	19.6	4.9	16,790	4,198
Street light service.....	10.4	2.6	9,048	2,262
City water mains.....	19.7	4.9	40,062	10,015
Power service extensions.....	.....	.....	2,000	500
Total.....	.....	.....	554,788	138,683

<sup>a</sup> Includes parking, curbs, gutters, storm-water drainage, cribbing, filling, etc.

Other city statistics were as follows:

## Post-office receipts:

1896 .....	\$50,193
1897 .....	53,117
1898 .....	59,063
1899 .....	61,454
1900 .....	69,826
1901 .....	80,305
1902 .....	94,035
1903 .....	108,242
1904 .....	116,854
First quarter, 1905 .....	30,626

## Bank clearances:

1896 .....	\$27,083,966.44
1897 .....	28,921,480.27
1898 .....	43,126,143.92
1899 .....	45,289,836.17
1900 .....	53,762,587.07
1901 .....	59,622,551.65
1902 .....	75,739,840.30
1903 .....	100,474,164.08
1904 .....	115,793,859.78
First quarter, 1905 ..	34,461,339.52

Year.	School census.	Names in city directory.	Population from directory (multiplier, 2½).	U. S. Census.
1870 .....				73
1880 .....				1,098
1885 .....	1,048	2,565	6,418	
1889 .....	3,281	9,676	24,190	
1896 .....	8,168			
1897 .....	8,000		<sup>a</sup> 42,459	
1898 .....	8,152			
1899 .....	8,360	15,740	39,390	
1900 .....	9,443	16,951	42,378	
1901 .....	10,573	20,418	51,045	
1902 .....	11,261	22,186	55,465	
1903 .....	12,662	25,057	62,642	
1904 .....	13,889	26,962	67,405	
1905 .....	14,425	<sup>b</sup> 29,918	74,795	

<sup>a</sup> Estimated.

<sup>b</sup> June.

The cut of Tacoma mills is given as follows:

Year.	Lumber.	Shingles.
	<i>Feet.</i>	<i>Pieces.</i>
1900 .....	185,414,130	178,386,000
1901 .....	219,150,000	251,000,000
1902 .....	275,000,000	347,565,000
1903 .....	347,000,000	376,935,500
1904 .....	233,000,000	310,567,000

## ROADS IN PIERCE COUNTY.

**Highways.**—The county built 7.68 miles of crushed-rock roads and 3.15 miles of gravel roads, total, 10.83 miles, during 1904, at a cost of \$15,183, and betterments to the extent of \$6,776. The amount spent for bridge repairs was \$40,630. For 1905 it is planned to expend at least an equal amount.

**Electric.**—109.4 miles of electric and cable (1.65 miles) roads are in operation in Tacoma and environs, including 11 miles of interurban line (in Pierce County) between Tacoma and Seattle, whose total length is 53.1 miles. No extensions in 1905. An interurban line between Tacoma and Olympia, 18 or 19 miles in Pierce County, total length between 30 and 31 miles, is under construction, of which 12 miles will be in operation August 1, and steps are being taken to secure franchise for road between Tacoma and Orting, about 18 miles.

**Steam.**—Two railroads, the Northern Pacific and the Tacoma Eastern, have terminals in Tacoma, with a combined trackage of 288 miles in Pierce County. The former extends to St. Paul, Minn., to Seattle, to Portland, and to Grays Harbor, with several branch lines to coal properties. The latter extends to their coal fields, near the base of Mount Rainier, that are being developed, and opens up new territory. The line will be extended to the Big Bottom country on the Cowlitz River during 1905, and will bring to market a large and productive agricultural section that now transports its products some 55 miles by team.

During 1904 one road spent \$425,000 in extensions and betterments and about \$75,000 during the first quarter of 1905. No similar data could be obtained from the other road.

The number of tons of freight received by the railroads at Tacoma in 1904 was 1,910,634 tons and the number forwarded was 317,095 tons.

*Power plant.*—During 1904 an electric power plant of 20,000 horsepower was completed and placed in operation at a cost of about \$3,000,000. Besides using the power for operation of electric lines in Tacoma and Seattle and between them, light in Seattle and at many small towns, it is largely used by many of the manufacturing enterprises in Tacoma, the Northern Pacific Railroad machine and repair shops, the city pumping plant, etc.

It is stated that power is being delivered to Tacoma for lighting and pumping purposes at the lowest contract price at which it is obtained at any city in the world, and that manufacturers here are obtaining this power at a lower price than obtained at any tide-water city in the United States.

\* \* \* \* \*

The Puget Sound country is mainly one of distribution, where water and land commerce interchange.

The land is covered with a heavy growth of timber, and its cultivation is not now an appreciable factor in the commerce of nations, nor is it likely to be for some years to come, except in so far as it cheaply supplies the wants of the people engaged in shipping and the large number engaged in the conversion of raw material into the finished product by manufacturing processes.

The import statistics show a falling off in butter, eggs, produce, and fruit, which might indicate that the adjacent country is more than keeping pace with growth in population. I find, however, that butter has been largely shipped in by rail, and that the local supply is far below the demand. The local supply of eggs until recently was equal to the demand, but eastern shipments are now on the increase. In none of those items is the country keeping abreast of the growth in the cities. Excepting tropical and early fruits and vegetables there is no apparent reason why this should be so. Speaking of tropical fruits, a large commission merchant, in touch with orange propagation, recently stated to me that he expected to receive his finest oranges from the lands in eastern Washington within a few years.

County officials say that a much larger percentage of the people coming to the State are settling in the country than formerly. Granting this, several years must elapse before its effect upon the imports of Tacoma will be appreciable.

The chief products are lumber and coal. While the former has decreased somewhat and the latter increased, they have not varied sufficiently during the past few years to affect the total export trade appreciably.

The products developed at the port are flour, cereals, product of the smelter, and product of lumber. The amount of export water commerce at the present time depends to a great extent upon the land under cultivation in eastern Washington and upon its grain shipment westward instead of eastward, where it has gone the last two years. No attempt has been made to obtain statistics relative to area of this cultivated land. The size of the grain crop and its comparatively uniform distribution over the United States regulates the condition of the market and the question of westward or eastward shipment. The shipment eastward the past two years caused a decrease of \$5,000,000 in the export trade of Tacoma, accounting for at least half of the decreased exports, cotton and sheeting, originating outside the State, being responsible for the remainder, though the slump of the latter from 1902 to 1903 was partly recovered in 1904. The distribution of grain between Tacoma, Seattle, and Portland is largely a question of location of buyers, facilities at terminal point, and railroad policy. I am informed that under the present estimate Tacoma will get 36 per cent, Seattle 24 per cent, and Portland 40 per cent of the western shipment of the 1905 crop.

The apparent general state of business is good.

Lumbermen say that the trade is active but price low. The demand is good, and judging by present orders the cut will exceed that of 1903.

Grain men say that the falling away of wheat shipments the last two years was due first to high price in the East that caught the tail end of 1903 crop, taking it east when it should have come west to complete an otherwise good year, and to the short crop and high price in 1904, which also went east, western terminal mills having to grind at a loss in order to protect their trade. The outlook is encouraging, and, barring eastern shipment, this port will handle as much wheat as in 1902 and will grind more flour. That the milling will more than offset the increase in agricultural country, and that owing to better transportation facilities the agricultural country has been largely increased, and in several districts the area has doubled this year.



Bankers state that the future looks flattering—more so than at any recent time. Big crops are expected and conditions are all favorable for large trade. Business is healthy and permanent. A few years ago banks were loaded with real-estate security. To-day they have practically none. To the eastern (Washington) wheat crop, that country promising greater yield than ever before, is largely due present conditions. Prices are good all along the line except lumber, which, notwithstanding the price, has an active demand.

The situation at Tacoma relative to water transportation is briefly this: A commodious harbor, rather too deep than otherwise, extending southerly with a width of over 2 miles between high bluffs to the alluvial plain at the mouth of the Puyallup River. The city is built on the elevated plateau on the west, extending south and eastward. The east bluffs are as yet unoccupied.

That portion of the industrial life of the city depending upon water transportation was first confined to the narrow rim of shoal water at the foot of the west bluffs, where land for mill and warehouse sites was made by hydraulically tearing down the bluffs or reclaiming land from the tide, and deep with mill refuse, areas with 30 and 40 feet of water on them being filled above the level of high tide. Several enterprises established themselves on the flats at the south, at considerable expense for long wharves to deep water and for protection from occasional floods and high tides.

The narrow rim suitable for industrial purposes along the outer harbor has been developed to nearly its fullest extent for a distance of 3 miles northward. Within a similar distance of the heart of the business district is the large extent of tide and river flats to the south and east almost wholly undeveloped. Both areas are equally inaccessible to communication by team. (A plank road has recently been built across the flats; in fact it is not quite finished.) There seems to be but one reason why this expanse of level land is not utilized—lack of transportation facilities, rail and water. The former is neither difficult nor very expensive to accomplish, for the main line of one railroad passes near and several switches already extend toward it. (An application for franchise for systematic extensions is now before the city and county officials for action.) Apparently, then, the lack of water transportation is the barrier that retards industrial progress in this direction. The reasonableness of this conclusion is, I think, apparent on closer investigation.

The alluvial plain that is slowly encroaching on the deep water on the harbor slopes gently and uniformly from line of mean high water for a distance of about a mile to low water line, then abruptly drops to deep water on a 25 per cent slope, approximately. To utilize this deep water for shipping purposes, as was done on the west side, would necessitate the construction and maintenance of long wharves at great expense—so great as to be prohibitive for concerns with small capital.

To develop this area the chamber of commerce planned a series of three main and four intermediate waterways, extending from deep water southward across the flats, somewhat as the fingers project from the hand. One of these, the city waterway, lying nearest the city, practically a prolongation of the west rim, has been improved, and the improvement of the Puyallup waterway extending near the center of the flats is partly provided for. The other main waterway, the Hylebos, following generally a creek of that name lying near the east side of the flats, within the 3-mile limit, exists on paper only.

The improvement of the city waterway was begun by the Northern Pacific Railway Company May, 1900, by dredging a channel along the west side, followed January, 1901, by a narrow channel on the east side, and November, 1901, by deepening of the west channel, each for a distance of about 4,300 feet. The improvement was completed by the General Government June 4, 1903–April 15, 1905. The waterway has a length of 7,850 feet, or 15,750 feet of dockage space. Fifty-seven per cent of this is now in use, eight industries having been established along it in 1904 and three in 1905.

The total amount appropriated by Congress for this waterway was \$175,000. Private enterprise has spent in utilizing this improvement and in preparing to utilize it, excluding all old industries that had previously located on the unimproved waterway, although their facilities were correspondingly enlarged, \$848,000; that is, for every dollar spent by the Government private enterprise has spent nearly five. The 43 per cent of unoccupied dockage space is owned almost entirely by a single corporation. I am informed by them that most of this is held for their own prospective use; some of it will be leased for periods of twenty to thirty years. None of it is for sale.

The improvement of the Puyallup waterway was partly provided for by the last Congress to the extent of \$240,000. This amount will provide 7,500 linear feet of dockage space. The work is not yet inaugurated, pending compliance by the public with certain Congressional provisions.

No new industries were established on the waterway in 1904, but several firms made marked extensions, although operating at a disadvantage in comparison with others on the harbor. I am informed that the erection of several large plants are in contemplation.

Lack of development is due largely to the existence of a bar at the mouth of the waterway that prevents access to the upper river to all but light-draft boats at high tide. It is believed that considerable commercial progress will mark the opening of this waterway to vessels.

The other main channel proposed, the Hylebos waterway, is still on paper and is not yet recognized by the General Government.

Two large industries are located here, one in 1904 and the other, although in operation, is not entirely completed. Until recently these plants could only be reached by light-draft boats at high tide. The newly constructed plank road enables them to reach the city by team. Their product is towed to deep water on barges, the same as is done by the industries on the Puyallup. As with the Puyallup waterway, it is my opinion that the improvement of this waterway will likewise result in its edges being lined with industries.

Both channels offer inducements for location of large industries on account of the great areas of adjacent level land and for small industries by reason of the low price at which sites can be purchased—the Puyallup, by reason of the fact that its shore lands are owned by a larger number of people than was the case with the city waterway, and by reason of its proximity to the built-up portion of the city recently made more accessible by extension of electric line; the Hylebos by reason of the fact that the shore lands are owned by a still larger number of people, less taxes, being outside the city limits, and yet nearer and more accessible by team than the north end of the industrial water front.

Although it is early to point to the growth of industrial enterprises around the city waterway, yet the progress already made is, I think, a concrete example of what will follow when the Puyallup and Hylebos waterways are improved.

Relative to general lines of industrial and commercial development that would be likely to follow improvements in facilities for water transportation, will say that there is reasonable certainty that the lumber industries on the city waterway must shortly move elsewhere for the lack of storage space for log rafts; also for the reason that the land now occupied will become too valuable for present use. The upper end of this waterway will be taken up with commission houses and such small industries that must be near the retail trade.

Other development that might be mentioned is nothing more than conjecture, and as such I predict that the railroad terminals of the Northern Pacific Railroad Company will be removed from Dock street on the west side of the waterway (city) and be laid out on the reclaimed flats; that other railroads entering Tacoma will establish their terminals on these flats; in fact, it is said that an option recently taken on a large tract of land on the east side of the Puyallup waterway was for railway terminals; that the west side of the city waterway will be given to wholesale trade and commission men who must have water facilities and yet be near the retail trade. The grain shipments will be made from warehouses on the flats whose remoteness from the business center is no disadvantage. Lumber mills, plants requiring large areas, and small plants with little capital will also congregate on the flats, but at greater distance from the business center, thus taking advantage of lower land values.

Consideration of the type and size of vessels entering this harbor (see table, p. 2533), in connection with the location of what are said to be the largest grain warehouses in the world, lead to the conclusion that the portion of city waterway north of Eleventh street should be dredged to depth of 35 feet at extreme low water.

There are no dangers or difficulties to navigation in this harbor, other than occasional delays to vessels navigating the city waterway due to failure to promptly open the two draw bridges across it. Service at both should be improved by giving more heed and prompt attention to boats' signals and by addition of mechanical devices to decrease time of operation. The question of portion of city waterway being occupied by log rafts to detriment of navigation has apparently been satisfactorily adjusted, at least for the present.

I am more than ever convinced that no portion of any waterway designed for use of deep sea-going vessels should be less than 500 feet in width.

The opening of the Puyallup waterway throughout its entire length, straightening its course as much as possible, is an improvement that will stimulate the commerce of this port and, if undertaken in advance of industrial growth, save many dollars of private money uselessly spent in overcoming existing obstacles to commercial intercourse.







The General Government can well afford to recognize the Hylebos waterway and plan for its improvement, developing such portions of it and in such manner as will best serve industrial interests, keeping just a little in advance of actual demands rather than behind them. There is no longer doubt that improved transportation facilities increase travel, build up the country, and create values. Examples are too numerous right here to controvert this statement. Just so I think it is with harbor improvements; the Government should lead rather than follow, improving such harbors and waterways as give promise of permanency and development, as the statistics herein show for the recently improved city waterway and harbor of Tacoma.

Very respectfully,

EUGENE RICKSECKER,  
*Assistant Engineer.*

Maj. JOHN MILLIS,  
*Corps of Engineers.*

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### W W 7.

#### IMPROVEMENT OF WATERWAY CONNECTING PUGET SOUND WITH LAKES UNION AND WASHINGTON.

The only work in progress during the year was in the nature of repairs and maintenance. The portage canal was cleaned out and straightened, the gates were rebuilt and enlarged, and two additional 30-inch siphons, making three in all, were installed to supplement the flow through the gates.

Bank protection work was also done in the cut or small channel between Lake Union and Salmon Bay, and the fences inclosing the Government property were repaired and extended.

Much trouble and embarrassment resulted from the construction of sewer outlets without authority, by the city engineer of Seattle, across the Government right of way and discharging into the canal cut which forms the outlet of Lake Union. These were finally removed by the city after a prolonged controversy, all damage to Government property was completely repaired, and a temporary trunk sewer, with outlet, properly authorized, was built.

The river and harbor act of March 3, 1905, appropriated \$125,000 for continuing dredging in Ballard Harbor, and the following provision, contained in the act of June 13, 1902, is repeated:

Nothing herein shall be construed as the adoption of any project for the construction of the waterway connecting Puget Sound with Lakes Union and Washington.

At the close of the fiscal year a project for the application of this appropriation had been submitted and was approved by the Chief of Engineers on June 20, 1905.

The work has been under the local charge of Mr. Thomas Irving, overseer, during the year.

The following are extracts from his annual report:

At the beginning of the year there was no work of construction or repairs under way. Work at that time consisted mostly of office work.

On August 9, 1904, work of alterations and repairs was begun at the portage canal and finally completed December 21.

A temporary dam was put in across the canal at the Lake Washington end, and as soon as completed the water was run out of the canal below and the work of repair begun.

The entire canal from the log gate to the temporary dam was cleaned out. An average depth of 2 feet of sand, gravel, and hardpan was removed, making the bottom of a uniform grade, and the sides were trimmed so as to give a channel 12 feet wide in the bottom at the narrowest points. The material was filled into dump wagons,

hauled out by teams, and dumped on one side of the reservation. About 1,200 cubic yards were moved in this manner.

The old timbers on the Lake Washington end of the canal, the remains of an old lock, were removed by blasting, which materially widened the mouth of the channel. The old lock gates, which had sunk in the canal, were also removed, thus giving the water an unobstructed entrance into the canal.

The old log gate at the portage dam was almost entirely rebuilt. The north side was torn out, new gate sills put in, embedded in concrete, lowering the sills about 1 foot, and the north side entirely rebuilt with new lumber, widening the gate from 6 feet 9 inches to 8 feet wide in the clear.

The south side of the gate was also greatly strengthened by the addition of new timbers. A heavy log gate, operating with hand lever, rack, and pinion, was constructed and found much more satisfactory than the old method of loose drop-plank gate, besides being much safer.

During the fall of 1903 a number of piles had been driven on the lower side of the old dam. These were used to build an addition to the existing dam. The lower row of piles were trimmed and furred out and sheathed with 4 by 12 inch planking, and the space between bulkhead and old dam was filled with selected earth placed in thin layers and well rammed in place. All earth fill next to log gate was placed in a similar manner.

At the upper side of the dam an intake for siphons was excavated, walled, and floored with heavy planking. The intake is 12 feet 6 inches wide and an average length of 10 feet, sufficiently large for four 30-inch siphons placed side by side. The floor is on the same general level as bottom of canal, which makes the top of intake opening of siphons at elevation 30, or about 3 feet below the summer level of Lake Washington.

In building the intake provision was made for a cofferdam at the outer end, so that repairs could be made to siphons without having to close down the canal.

On October 1 all work necessitating the canal being empty being completed, the temporary dam was removed, the canal filled, and a test of the dam made, which proved to be thoroughly water-tight.

The old 30-inch siphon was removed and remodeled on the same plans as the two new 30-inch siphons, for the building of which a contract was awarded to the T. F. Clark Company, of Seattle.

The work of completing and installing the siphons being delayed, owing to the difficulty the contractor had in getting some of the parts, the siphons were not finally installed till December 11, 1904. The three 30-inch siphons are placed side by side, sufficient room being left in the intake for placing a fourth siphon if ever found necessary to do so.

\* \* \* \* \*

Siphon No. 2 was put in operation December 13, 1904. Stopped March 18, 1905. No attempt was made to start it up till March 29. Stopped again April 17, and Lake Washington being low and falling it has been allowed to remain idle.

\* \* \* \* \*

The stopping each time of siphon No. 2 was caused by logs grounding in the canal, thus forming a temporary dam and preventing sufficient water flowing to supply the siphons.

The removing of the old lock timbers at the head of the canal, cleaning out and widening the canal, widening and deepening the log gate, and placing two additional 30-inch siphons have greatly increased the amount of water flowing through the canal into Lake Union.

#### CANAL CUT BETWEEN FREMONT AND SALMON BAY.

The work on this section of the canal consisted principally of bulkheads and brush work for bank protection.

At a point on the south bank of the canal 900 feet west of the Fremont Bridge 40 piles were driven for a distance of 235 feet. All loose material was cleaned from around the piles, and brush, commencing from solid bottom, was placed 2 feet thick. Commencing from the brush, 3 by 12 inch planking was spiked on the canal face of the piles above the highest water mark. Brush, before planking was begun, was weighted down with sacks filled with gravel and clay.

Two rows of piles were driven across the old channel, 28 piles in all, all loose material cleaned away, and brush, starting from hard bottom and extending back to inner row of piles, was placed 2 feet high and weighted down with sacks. Three by 12 inch planking was spiked on the canal face of the outer row of piles. Brush was

used against the inner row of piles and the core partly filled with earth. This dam was built to confine the flow of water to the new channel, preventing further cutting out and probably encourage filling of old channel.

Across the channel, 300 feet above Ross Bridge, two rows of 7 piles each were driven for the purpose of building a dam to keep out tide water at any time it may be necessary to do so to facilitate repairs in the canal above.

The south bank of the canal, between Lake Union outlet gates and the Fremont Bridge, was repaired by placing a heavy layer of brush 3 to 4 feet thick and weighted down with sacks filled with clay and the inner end of the brush covered with earth.

Sixteen and five-tenths rods of fence were built across the sand spit at the lower end of Salmon Bay to prevent trespass on the right of way. No other work was done on the lower end during the year. An allotment has recently been made for improving the channel from deep water to the wharves at Ballard, but work has not yet commenced.

\* \* \* \* \*

During the latter part of May two teams and two laborers were put to work removing a sand and gravel bar which had accumulated in the channel about 1,000 feet west of the Lake Union outlet gates and changed the current as to direct it against the north bank, causing it to cave.

Part of the gravel was removed and a deeper and straighter channel made. The material moved was placed against the toe of the caving bank, forming an apron, and preventing the water washing against the bank and causing further caving.

\* \* \* \* \*

#### PORTAGE CANAL.

On May 19 siphon No. 3 stopped and has been allowed to remain idle. This siphon was first put in operation December 12, 1904, and with the exception of once stopping on February 18, 1905, when it was immediately started up again, it had been in continuous operation one hundred and fifty-eight days at the time it stopped on May 19.

Siphon No. 1 was first put in operation December 13, 1904, and has been in continuous operation one hundred and ninety-nine days when it was stopped on June 30 to be shut down during the low-water season.

In view of the provisions of the last river and harbor appropriation act it is not practicable to submit estimates for continuing the work.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$23,511.51
Amount appropriated by river and harbor act approved March 3, 1905 ..	125,000.00
	<hr/> 148,511.51
June 30, 1905, amount expended during fiscal year, for maintenance of improvement.....	9,960.15
	<hr/>
July 1, 1905, balance unexpended.....	138,542.36
July 1, 1905, outstanding liabilities.....	265.50
	<hr/>
July 1, 1905, balance available.....	138,276.86

#### APPROPRIATIONS.

August, 18, 1894.....	\$25,000
June 3, 1896.....	150,000
June 13, 1902.....	160,000
March 3, 1905.....	125,000
	<hr/>
Total .....	460,000

COMMERCIAL STATISTICS.

Salmon Bay (Ballard).

EXPORTS AND IMPORTS.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>	
Lumber and products.....	55,218	\$278,157	729	\$7,140
Logs .....			268,653	1,086,278
Miscellaneous merchandise .....	117	6,188	734	53,004
Total.....	55,335	284,345	270,116	1,146,422

Number of passengers carried, 27,101.

Two sailing vessels and 3 steam vessels of 2,098 total net tonnage were built at Ballard during the year.

Lakes Union and Washington.

LOCAL TRAFFIC.

Articles.	Quantity.	Value.
	<i>Tons.</i>	
Agricultural implements .....	140	\$4,200
Brick .....	137	8,000
Coal.....	2,400	7,000
Hay and grain .....	260	5,950
Live stock .....	7,663	82,880
Lumber and products .....	19,011	157,250
Logs and shingle bolts.....	211,289	614,661
Miscellaneous merchandise.....	7,583	200,787
Wood .....	10,195	9,290
Total.....	258,628	1,090,018

Number of passengers carried, 144,480.

REPORT OF MR. THOMAS IRVING, OVERSEER.

UNITED STATES ENGINEER OFFICE,  
Fremont, Wash., April 19, 1905.

SIR: I have the honor to hand you herewith commercial statistics and report for Lakes Union and Washington and Salmon Bay for the calendar year 1904.

The statistics for Lakes Union and Washington show a decided increase for 1904, in many of the items, over those for 1903. The greatest increase is in agricultural implements, eggs, feed, general merchandise, logs, lumber, and shingles.

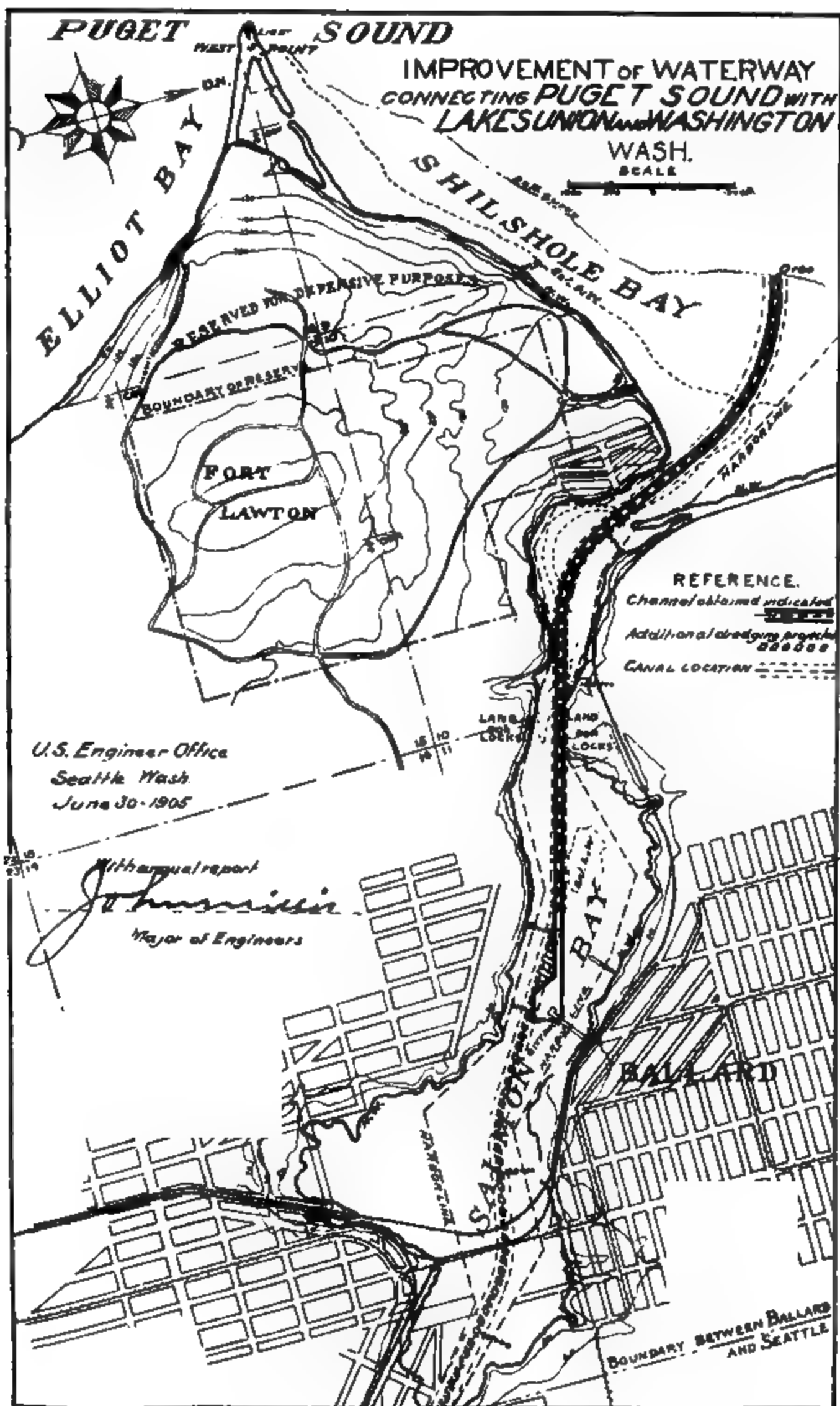
The increase in farm products and farm implements is due to the steady increase in acreage which is being brought under cultivation on the east side of Lake Washington. Many new settlers are coming in who are purchasing small farms from 5 to 100 acres each, which are rapidly put under cultivation, producing fruits and general farm products.

There is a large tract of land on the east side near the south end of the lake, which was opened up during 1904, known as the Garden of Eden. This is being sold in lots and 5 and 10 acre tracts, many of which have been settled on and put to producing.

Two new shingle mills and one lumber mill have been built and put in operation since January, 1904. This, and the improvement of existing mills, accounts largely for the increase in the lumber and shingle business, as shown by these returns.

The large consumption of lumber, all of which is cut from the land immediately around Lake Washington, will naturally raise the question of the future lumber supply. From information obtained from conservative parties who are well posted in this matter it is claimed that the supply of lumber accessible to Lake Washington will be sufficient for all demands for forty years yet at the present rate of consumption.

There are 12 steamers of 15 to 500 gross tonnage at present operating on Lake Washington in a general freight and passenger business between the east and the







west shore of the lake. One of these steamers, the *Acme*, makes one trip daily up the Sammamish River to Bothell and return. There are also 2 new steamers under construction, which are to operate on the lake when completed.

The people living in the neighborhood, and particularly those doing business on the lake, are very positive in their opinion as to the benefits they would derive and the large increase in commerce that would follow the completion of the Lake Washington Canal.

It is claimed that the completion of the canal would make the shores of the lake very desirable for the establishment of large manufacturing plants, and that a large coal shipping business would develop from the Renton and Newcastle coal mines.

\* \* \* \* \*

While I have spent a good deal of time and exercised great care in gathering the data for compiling the commercial statistics for the lakes, I know there is a large amount of farm produce which passes over the lake of which I have been unable to get any record. The produce referred to is usually loaded upon wagons, team and load carried over the lake on the ferry boat *King County*, and delivered direct.

The team is carried over the lake and fare collected as one team, without any record being taken of the nature or value of the contents of wagon. We therefore get no return for such, and consequently it does not appear in the statistics.

The statistics for Salmon Bay for the calendar year 1904 show a decrease of \$61,750.69 in the value of imports from those for 1903.

It would naturally be expected that the completion of the dredging of a channel from deep water to the city dock would have increased the imports into Ballard Harbor. The returns show the reverse. The largest item of the imports (logs) was 4,271,001 feet less in 1904 than for the previous year. This no doubt was largely due to the weakness of the lumber market during 1904. The price of lumber was so low during this year that many of the mills did not run to their full capacity.

The mills in Ballard Harbor, particularly those situated east of the city dock, are very much handicapped in handling their logs, which can only be got to the mills during high water. Logs in that vicinity are left stranded in the mud at low tide. Their present method of offsetting this difficulty is in the building of a gridiron at the foot of their log incline. This is loaded with logs at high tide, so that at low water they can drag them off the gridiron to the incline.

Improvements of the harbor by dredging a channel farther up the harbor, up to the bridge crossing, would probably result in the mill owners asking permission to do some private dredging from the channel proper to their mill sites, which would enable them to handle their logs at any stage of the tide and get barges to their mills, which would, I think, result in a material increase of the amount of lumber shipped by water from this port.

The returns show a decrease of \$23,554.16 in the value of exports for 1904 from those for 1903.

Since the channel was dredged in Ballard Harbor, much larger vessels can be brought up to the city dock, where they are partly loaded, then towed out and anchored in Shilshole Bay, where the balance of their cargo is brought to them by barges.

The dredging of a deeper and wider channel, so that vessels could complete their loading at the docks, would be a great help to the lumber business generally and result in more lumber being shipped by water than at present.

While 4,855,405 feet more lumber was exported by water in 1904 than during 1903, the total value of lumber exported by water for 1904 was \$23,354 less than that for 1903. This is principally accounted for by the low price to which lumber fell during 1904.

There was very little done in the shipbuilding business during 1904. Work along this line was mostly repair work. This had some bearing upon the value of the imports and exports.

Many of the Ballard mills have recently been overhauled, and in some the capacity increased from 25 to 50 per cent, and all mills appear to be very busy. The Stimson Mill Company have recently begun running their mill night and day, thus increasing the capacity about two-thirds.

One new lumber mill and one new shingle mill are now under construction and will shortly be in operation.

Very respectfully, your obedient servant, —

THOMAS IRVING,  
Overseer.

Maj. JOHN MILLIS,  
Corps of Engineers.

W W 8.

IMPROVEMENT OF EVERETT HARBOR, WASHINGTON.

The work of dredging and dike construction in accordance with approved projects has been completed.

No work was done during the year except general care and supervision of the improvement. A number of inspections were made. Numerous cases of violation of the law by dumping sawmill refuse into the harbor were observed, and repeated efforts were made to induce mill owners to conform to the law, but so far these efforts have not met with success.

Appropriations have been made for this improvement to the limit of the expenditure heretofore authorized by Congress.

Provision has been made in the river and harbor act of March 3, 1905, for an examination of Everett Harbor, with a view to the extension of the dike and of the dredged area.

In compliance with the above a report of preliminary examination was submitted on June 24, 1905.

Money statement.

July 1, 1904, balance unexpended .....	\$9,372. 22
June 30, 1905, amount expended during fiscal year, for maintenance of improvement.....	953. 40
July 1, 1905, balance unexpended .....	8,418. 82
July 1, 1905, outstanding liabilities.....	3. 30
July 1, 1905, balance available.....	8,415. 52

APPROPRIATIONS.

August 18, 1895 .....	\$10,000	March 3, 1901.....	\$90,000
June 3, 1896 .....	20,000	June 28, 1902 .....	117,000
March 3, 1899.....	50,000		
June 6, 1900 .....	135,000	Total .....	422,000

COMMERCIAL STATISTICS.

Shipping.

	Arrivals.	Departures.	Total gross tonnage.
Steam vessels.....	14	14	36,523
Sail vessels .....	100	100	60,000
Total .....	114	114	96,523

Twenty steam vessels with aggregate gross tonnage of 4,515 tons were engaged in local traffic.

Exports and imports.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>	
Lumber and products.....	120,271	\$729,457		
Lime rock .....			4,769	\$7,153
Paper .....	4,831	386,525		
Pig lead.....	3,055	183,300		
Ore .....			6,385	702,350
Miscellaneous merchandise .....	9,987	387,600	14,049	945,830
Total.....	138,144	1,686,882	25,203	1,655,338

In addition to the above quantities 171,236,612 feet, board measure, of saw logs were towed to the mills at Everett and floated down the Snohomish River near Everett, and 124,430 linear feet of piling were towed to works on the Snohomish River. Total value of logs and piling \$1,223,335.

REPORT OF MR. J. M. CLAPP, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,  
Seattle, Wash., July 15, 1905.

MAJOR: In compliance with your instructions of March 24, I have the honor to submit with the list of commercial statistics the following report relative to the commerce of Everett.

Comparatively Everett is a young town, and prior to the building of the Great Northern Railway to the coast in 1891 and 1892 was simply indicated on the map as a number of ranches or timber claims. To-day it is a city of about 12,000 inhabitants.

Substantial improvements in the nature of brick blocks, libraries, etc., have been erected and indicate a healthy business state of affairs.

It is peculiarly located on a peninsula formed by the Snohomish River on the east and north sides and Puget Sound on the west side. Such a location gives Everett a water front on three sides, aggregating 9 miles on the Everett side of the river and sound and 7 miles on the opposite side of the river. This water front affords suitable locations for manufactories, and especially for those engaged in the manufacture of timber products.

The mills shipping their products by rail only are located along the shallow channels of the river and upper harbor, while those shipping in cargo lots by vessels as well as rail are located upon the deep water of the lower harbor.

The Snohomish River is the highway for the bringing to market of a great area of timber, and naturally many plants for the manufacture of timber and shingles are located at the mouth of this river.

With its tributaries the river drains fertile valleys of large acreage wherein numerous farms are being improved. The giant trees, with their huge roots surrounded with thickets of alder and second-growth fir, make the labor and expense of clearing the land very great. In the face of this expense and the undertaking, settlers are converting these forests of stumps and logged-off lands into productive farms.

Throughout western Washington the valleys are most fertile and productive. Everywhere settlement is being made, land clearing is going on, and homes being made. The locations favored with good roads or with rapid transit, such as provided by railways, boats, or interurban cars, are the most desirable and first to be settled. Everett is perhaps a little more favorably situated than most of the neighboring towns and has perhaps a larger proportion of settlers adjoining it.

While this settlement and farm building is going on in the valleys adjoining Everett, the city itself is not supported by the farming community, but, on the contrary, the manufacturing industries located at Everett largely support the farming communities.

It is estimated that the increase in population in the county and in the city was about 5 per cent over the previous year.

The area cleared and cultivated has increased by a larger per cent than the year previous.

While Everett is the center of a farming and manufacturing community, it is also located in the vicinity of a mining region. A smelter is operated here and handles a great many tons of local as well as outside ores.

It is the junction point for four lines of railways—the Great Northern main line the Great Northern coast line, Everett and Monte Cristo Railway, and the Northern Pacific branch line to British Columbia.

The city is growing and developing, new manufactories are being added annually, and recently a floating dry dock, capable of handling tugs and vessels under 300 tons, was launched.

It is estimated that \$100,000 was expended in new plants and the enlargement of old ones in 1904.

Some of the vessels engaged in foreign and domestic coastwise trade make Everett a port of call, and any of the vessels entering Puget Sound can reach the port and receive cargo.

Small steamers communicate with the numerous ports of the island counties, and larger steamers with the more important ports on Puget Sound and Bellingham Bay. These contribute largely to the business of the port, which is the distributing point for a great area of country.

The railroads give Everett terminal rates.

The volume of business of all the manufacturing plants is dependent upon the demand.

The factories at Everett, being principally those engaged in the manufacture of lumber, shingles, etc., depend upon the demands for lumber from outside markets.

During 1904 the demand for lumber from other markets was not quite as great as for the preceding year, and the volume of business along this line was not quite as great. However, there were other things which tended to make the total business about equivalent to that of the preceding year.

The rapid immigration of settlers to the town and county created a greater demand than formerly for supplies for the home market.

Improvements to the homes already built also contributed to this demand.

Advantage was also taken by the mill owners of the slack times in manufacturing to overhaul, repair, and in cases enlarge their plants.

It is not known that the improvements already done in Everett Harbor by the General Government has materially contributed to the general prosperity of the port of Everett and its adjacent country.

Very respectfully, your obedient servant,

J. M. CLAPP,  
*Assistant Engineer.*

Maj. JOHN MILLIS,  
*Corps of Engineers.*

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W W 9.

#### IMPROVEMENT OF SNOHOMISH RIVER AT STRETCHS RIFFLE, WASHINGTON.

This is a new work. The first appropriation was made by the river and harbor act of March 3, 1905, which provides as follows:

Snohomish River at Stretchs riffle, Washington: Completing improvement in accordance with the approved project contained in House Document Numbered One hundred and sixty-three, Fifty-eighth Congress, second session, six thousand five hundred dollars.

In its original condition the Snohomish River at Stretchs riffle is impassable at low water, caused by deposits of coarse gravel and small boulders.

The original and existing project contemplates construction of a single pile, brush and stone dike intended to rectify the channel at Stretchs riffle and maintain a navigable depth of 4 to 5 feet at low stages. Project adopted by act of March 3, 1905.

The estimated cost is \$6,500.

No expenditures have been made on this work.

The commerce to be benefited by the proposed improvement is principally that represented by logging interests, and the improvement will also provide an outlet for farmers and fruit raisers along the Snohomish River.

Project for the application of the amount appropriated has been approved, and work will start as soon as the stage of the water permits.

*Money statement.*

Amount appropriated by river and harbor act approved March 3, 1905...	\$6,500.00
July 1, 1905, balance unexpended .....	6,500.00

W W 10.

IMPROVEMENT OF SWINOMISH SLOUGH, WASHINGTON.

Repairs to the dikes continued until January 14, 1905, when work was suspended on account of exhaustion of available funds.

The repairs to the inner dike between Gallahers Point and McGlinns Island were completed and 11,087.75 cubic yards of rock were placed in it, at a cost of 6.55 cents per cubic yard, total, \$7,262.48.

Work on the outer dike was commenced on December 4, 1904, and suspended from January 14, 1905, till May 1, 1905, owing to lack of funds.

The river and harbor act of March 3, 1905, provided as follows:

Improving Swinomish Slough, Washington: Continuing improvement, five thousand dollars.

Upon approval of project for application of the appropriation of March 3, 1905, for continuing the work, preparations were begun to resume placing rock in the outer jetty, and at the close of the year operations were in active progress. A total of 2,750 cubic yards of rock was placed in the outer dike.

The work was in charge of Mr. Thomas H. Huddleston, inspector. The following are extracts from his annual report:

During the year the work started at the close of the previous year on refilling with rock the Gallaher Point dike was continued and completed. A railway was constructed along the outer dike a distance of 6,264 feet and a quarry opened on Fidalgo Island and work commenced on the refilling of the dike.

\* \* \* \* \*

In previous operations at the quarry no spalls had been removed and the rock being of unstratified formation several thousand cubic yards were wasted at the entrance to the quarry, which it was necessary to remove to allow access to the quarry face.

About 3,120 cubic yards of spalls were loaded with shovel and deposited on the bottom along the bay side of the dike for a foundation course, immediately stopping scour and settlement, which were endangering the old dike structure and allowing much silt to enter the channel from the north fork of the Skagit River. As the spalls were removed the two tracks were extended toward the quarry face. A large amount of bench and toe was removed before the quarry face was in proper shape for blasting down from deep holes. The first deep holes were put down with  $\frac{7}{8}$ -inch octagon steel by hand, but owing to the depth and cracks encountered slow progress was made. On September 1 the first supply of large rock was blasted. A portable derrick was used in loading the larger rock with chain slings and hand and shovel rock with skips. An average of 2,327 cubic yards per month were placed in the three months following. A No. 5 Rand steam drill was installed on October 9, which facilitated the work greatly. A boiler to supply steam was rented at \$12 per month.

\* \* \* \* \*



The work continued steadily until the fill was brought up to elevation 18 feet above mean lower low water, making an average fill of 8 feet in height above the ground with a 1 to 2 foot slope on the bay side and a 1 to 3 foot against the dike. It was difficult to retain the large rock on the top of the fill owing to the drop received in being dumped from the cars. Work was completed on December 3, 1905, at noon, and the plant immediately transferred to the quarry opened on Fidalgo Island for filling the outer dike.

The following table shows the yardage placed each month of 1904:

	Cubic yards.
June, 15½ days .....	854. 00
July, 25 days .....	1, 344. 75
August, 26 days .....	1, 782. 00
September, 25 days .....	2, 400. 00
October, 24 days .....	2, 505. 00
November, 23 days .....	2, 076. 00
December, 2½ days .....	126. 00
Total .....	11, 087. 75

A royalty of 6 cents per cubic yard paid, amounting to \$665.27.

All labor office force and superintendency per cubic yard, \$0.655.

*Outer dike.*—On July 12 plans and estimates were made for repairing the outer dike, which extends from near the Hole in the Wall to a point opposite the outer end of Goat Island, a distance of 6,299 feet. The plans as approved were to open a quarry 200 feet north of the east end of the dike on Fidalgo Island on land allotted to Dick Gwil Kause, a Swinomish Indian, transfer the rock in cars by railway supported on old dike where capable, and build additional support where necessary. Examination proved that an elevation of 11 above mean lower low water was as high as the piles could be used with safety as many bearing piles were driven to elevation 7. These piles were extended by block fastened to the top of the piles and cap placed on the blocks.

The 1,038 piles in the dike extending above the elevation 11 were sawed off by contract at 17½ cents each.

Three hundred and thirty-four piles for the railway along the dike and spur track to quarry were driven at \$2.95 each; 176,826 feet B. M. of 8 by 8 inch caps and 12 by 12 stringers were purchased by contract at \$1,299.62. These were secured by ½ by ¾ inch drift bolts and ¾ by 20 inch timber dogs.

A crew of six men and snag boat placed the timber and available track rails.

Before the timber dogs were placed a severe storm drove logs against the work, breaking off several piles and causing 80 stringers to go adrift; 28 were recovered; none have been displaced since the timber dogs were placed. On November 14 the steam drill was put in operation at the outer quarry. Three 27-foot holes were drilled and blasted to raise floor of quarry above high water, the track was extended into quarry, and the transfer from the quarry made by the snag boat. On December 10 the placing of rock commenced at the east end of the outer dike from cars, and a single-spur track in the quarry being used until more track room was available.

Most of the rock handled was decomposed light-weight surface rock, which has made an excellent fill, but the crown was displaced several times by storm and necessitated the replacing.

Six 27-foot holes were drilled with the steam drill and 4 blasted.

On January 14, 1905, work was discontinued for lack of funds, 1,778 cubic yards having been placed during the twenty-seven days worked. A royalty of 4 cents per cubic yard was paid for the stone; total, \$71.12.

\* \* \* \* \*

The Gallaher Point dike filling was beaten down by logs and drift during the extreme high tides and storms during the winter months, but in no place below the ordinary high tides. By repairing the low places on the crown with large-size rock the work can be left with full confidence of its permanency.

The channel opposite the dike from the Hole in the Wall to Gallahers Point is rapidly moving the bar across toward the opposite shore, and indications are that the channel will resume its old bed near the point.

\* \* \* \* \*

On May 1 instructions were received to prepare to resume operations on repairs to the dikes.

The work of placing the rock in the dike was resumed on June 15 with a force of 8 men, and on the 20th a full crew of 15 men were employed, 8 men loading cars, 2 hand and machine drillers, 1 tool sharpener, 1 engineman and swing man on derrick, and 1 engineman and 1 dump man on the train.



During the 13½ days worked 972 cubic yards were placed in the dike, an average of 72 cubic yards per day; cost for crew, \$37.64; launch hire, water-scow rent, coal and oil, \$4.49; total, \$42.13 per day, or 58.9 cents per cubic yard. A royalty of 4 cents per cubic yard was paid for the rock.

The total amount of rock placed in the outer dike during the fiscal year was 2,750 cubic yards, 1,081 yards during December, 697 yards during January, and 972 yards during June.

*Money statement.*

July 1, 1904, balance unexpended .....	\$19,969.91
Amount appropriated by river and harbor act approved March 3, 1905..	5,000.00
	<hr/> 24,969.91
- June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	19,284.46
	<hr/> 5,685.45
July 1, 1905, balance unexpended .....	5,685.45
July 1, 1905, outstanding liabilities .....	1,266.05
	<hr/> 4,419.40
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905.....	149,130.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

See estimate submitted in letter to the Chief of Engineers, December 31, 1904.

APPROPRIATIONS.

July 13, 1892.....	\$25,000	June 13, 1902.....	\$30,000
August 18, 1894.....	25,000	March 3, 1905 .....	5,000
June 3, 1896.....	25,000		
March 3, 1899 .....	20,000	Total .....	130,000

COMMERCIAL STATISTICS.

*Exports and imports.*

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>	
Agricultural implements.....	25	\$11,000	175	\$13,300
Fish, fresh.....	1,364	109,120		
Grain.....	25,000	625,000	180	3,600
Gravel.....			2,800	2,520
Hay.....	14,000	154,000		
Hops.....	28	15,600		
Live stock.....	75	16,800	130	19,500
Miscellaneous merchandise.....	566	142,542	3,478	391,432
Seed.....	18	4,680		
Lumber.....	5,425	24,000		
Wood.....			3,000	6,000
Total.....	46,499	1,102,742	9,763	436,352

Forty-one million five hundred thousand feet, board measure, of saw logs, 200 cords of shingle bolts, and 38,350 linear feet of piling, valued at \$255,450, were towed through Swinomish Slough during the year.

W W II.

IMPROVEMENT OF NEW WHATCOM HARBOR, WASHINGTON.

A channel 50 feet wide with a depth of 12 feet at low water and extending the whole length of the waterway on the south side from deep water to the inner end, about 3,300 feet long, and a basin of same depth at the inner end, having a length of 383 feet and a width of 330 feet, the full width contemplated for the completed waterway, were completed last year.

Some additional dredging under authority of the Department was subsequently done by the contractors under a private contract, the material being used for filling land.

The act of March 3, 1905, appropriated \$35,000 for continuing the work.

The work was advertised under approved specifications, and the lowest bid accepted. At the close of the year, completing the preparation of contract papers was in progress.

Money statement.

July 1, 1904, balance unexpended .....	\$1,683. 33
Amount appropriated by river and harbor act approved March 3, 1905 ..	35,000. 00
	<hr/>
	36,683. 33
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	733. 32
	<hr/>
July 1, 1905, balance unexpended .....	35,950. 01
July 1, 1905, outstanding liabilities .....	144. 89
	<hr/>
July 1, 1905, balance available .....	35,805. 12
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement.....	\$20,000. 00
For maintenance of improvement .....	5,000. 00
	<hr/>
	25,000. 00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

June 13, 1902 .....	\$25,000
March 3, 1905 .....	35,000
	<hr/>
Total .....	60,000

COMMERCIAL STATISTICS.

Shipping.

	Arrivals and de- partures.	Total gross ton- nage.
Steam vessels .....	150	271,104
Sail vessels.....	53	64,271
Total .....	203	325,375





Exports and imports.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>	
Beer .....	6,988	\$50,094	300	\$2,400
Coal.....	52	229	4,380	18,189
Flour and grain.....	120	3,330	3,200	97,550
Hay .....	12	180	3,745	40,565
Lumber and products.....	158,145	867,097		
Live stock.....	3,487	15,276	1,159	44,320
Machinery .....	68	10,650	94	13,050
Miscellaneous merchandise.....	4,902	178,031	14,040	1,204,686
Salmon, fresh.....			9,267	138,673
Salmon, canned.....	2,395	276,950	9,376	1,046,560
Sand, building.....			7,280	5,200
Tin cans .....	7,594	210,000	65	2,500
Total.....	183,763	1,611,837	52,906	2,613,643

NOTE.—The large increase in exports and imports over previous years is partly due to the consolidation of the cities of Whatcom and Fairhaven under the name Bellingham. Previous reports were for Whatcom only.

One hundred and twenty-six million feet, board measure, of saw logs were towed to the mills at Bellingham during the year. Total value, \$965,653.

REPORT OF MR. F. S. GREELY, SURVEYMAN.

BELLINGHAM, WASH., April 4, 1905.

SIR: I have the honor to submit herewith the commercial statistics of Bellingham (Whatcom) Harbor for the calendar year 1904, in accordance with your instructions.

The statistics show a large increase over those of 1903, but this is due to the fact that the towns of Fairhaven and Whatcom were consolidated under the name of Bellingham, and the statistics of 1904 are for Bellingham. However, there was an increase in the amount of freight received and shipped over the docks of what was Whatcom. The estimated increase of population for 1904 is 5,000 inhabitants, and building permits were issued to the amount of \$494,415.

When the proposed improvement of the Whatcom Creek waterway is completed it will provide a protected harbor for small crafts that are engaged in traffic at this place, and will also provide room for any number of docks that may be needed for the handling of freight and passengers. Before the dredging of the waterway was started there was but one dock for public use and that about a mile from the business center of the city. There is now a dock on the east side of the waterway that was constructed last year, and a number of vessels discharged freight there, mostly hay and grain, but the present width of the dredged channel is not sufficient for safe navigation. After the present proposed dredging is completed vessels can dock within five blocks of the business center of the city and this will facilitate the handling of freight.

Messrs. Roth and Roeder, who own the property adjacent to the inner end of the waterway, contemplate the construction of a dock from their property to the dredged basin for the use of any boats receiving or discharging freight or passengers at this place.

Respectfully submitted.

Maj. JOHN MILLIS,  
Corps of Engineers.

F. S. GREELY,  
Surveyman.

W W 12.

IMPROVEMENT OF OKANOGAN AND PEND OREILLE RIVERS, WASHINGTON.

No work was done on the Okanogan River during the past year on account of lack of funds.

The plant was laid up near Alma and cared for by a watchman.

Cables were laid to assist vessels over the rapids at the following places:

Rapid No. 8, or Byers Rapids.  
Granger Rapids.  
"Riffle."  
Above Rapid No. 13.  
Rapid No. 14, or Guthrie Rapids.  
Rapid No. 15, or Chilowhist Rapids.  
Rapid No. 17, or Crazy Rapids.

No work has been done on the Pend Oreille River since it was suspended on December 16, 1903, on account of lack of funds.

The act of March 3, 1905, appropriated \$15,000 for maintenance of the Okanogan River and for continuing improvement and maintenance of the Pend Oreille River. At the close of the year a project for the application of this appropriation had been submitted and was under consideration by the Chief of Engineers.

In my opinion Box Canyon, on the Pend Oreille River, is not worthy of further improvement by the Federal Government, for the reasons that the canyon can only be made safely navigable, except perhaps at extreme low water, with a large expenditure, if at all, and that on account of the very short portion of the river that is navigable below the canyon, and the limited benefits that would follow from the necessary outlay, the expenditure is not warrantable. Necessary work of maintenance of navigation between Box Canyon and Newport is worthy of being done by the Federal Government.

*Money statements.*

OKANOGAN RIVER.

July 1, 1904, balance unexpended .....	\$2,427.21
Amount appropriated by river and harbor act approved March 3, 1905..	5,000.00
	<hr/>
	7,427.21
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	1,638.29
	<hr/>
July 1, 1905, balance unexpended .....	5,788.92
July 1, 1905, outstanding liabilities .....	318.93
	<hr/>
July 1, 1905, balance available .....	5,469.99
	<hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905.....	5,000.00
{ Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

PEND OREILLE RIVER.

July 1, 1904, balance unexpended .....	<sup>a</sup> \$746.83
Amount appropriated by river and harbor act approved March 3, 1905..	10,000.00
	<hr/>
	10,746.83
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	358.02
	<hr/>
July 1, 1905, balance unexpended .....	10,390.81
July 1, 1905, outstanding liabilities .....	30.00
	<hr/>
July 1, 1905, balance available .....	10,360.81
	<hr/>

<sup>a</sup> \$2 disallowed and deposited during year.

Amount (estimated) required for completion of existing project .....	\$2,500.00
Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905:	
For works of improvement.....	\$2,500.00
For maintenance of improvement.....	5,000.00
	7,500.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	

APPROPRIATIONS.

March 3, 1899.....	\$25,000
June 13, 1902 .....	22,500
March 3, 1905.....	15,000
Total .....	62,500

COMMERCIAL STATISTICS.

Okanogan River.

EXPORTS AND IMPORTS.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		Tons.	
Agricultural implements .....			166	\$24,862
Lumber and products.....			74	1,422
Machinery .....			56	7,840
Ore.....	84	\$8,400		
Wool .....	83	24,900		
Miscellaneous merchandise.....	23	4,400	1,150	180,590
Total.....	190	37,700	1,446	214,714

Five stern-wheel vessels with an aggregate gross tonnage of 748 tons made 70 trips on the river during the year.

REPORT OF MR. C. E. HANSEN, OVERSEER.

WENATCHEE, WASH., May 13, 1905.

MAJOR: I have the honor to submit herewith the commercial statistics of water traffic on the Okanogan River for the calendar year ending December 31, 1904.

Names of boats, etc., operated on the Okanogan River during the year 1904.

Names.	Class.	Tonnage.		Length	Breadth.	Depth of hold.
		Gross.	Net.			
				Feet.	Feet.	Feet.
Chelan.....	Stern wheel .....	244	154	120.0	20.0	5
North Star .....	do .....	144	91	100.0	16.0	4
Gerome .....	do .....	109	74	85.0	16.0	3
Alex. Griggs .....	do .....	159	100	111.3	19.½	3½
Enterprise .....	do .....		92	85.0	17.1	3¼



*Columbia and Okanogan Steamboat Company boats.*—*Gerome*, 23 trips; made first trip of the fleet April 15, 1904. *Chelan*, 4 trips; made last trip of the fleet July 11, 1904. *North Star*, 6 trips; length of route about 40 miles. *Alex. Griggs*, 7 trips, average time consumed on up-river trip, eight hours; on down-river trip, four hours. *Enterprise*, 30 trips; first trip, April 15; last trip, September 4, 1904.

Of the imports, 1,056½ tons were carried by the Columbia and Okanogan Steamboat Company and 349 tons by the *Enterprise*, owned then by Charles Ostenburg, of Alma.

The former amount was taken from the company's records and is correct and reliable. The amount carried by the *Enterprise* was also taken from records, but some amounts may have been overlooked. The amount appears to me small when it is considered that 30 trips were made by that boat, making an average of about 11½ tons to the trip. However, as there was keen competition between the two carriers it may be entirely correct.

The shipments were made to Alma and Riverside, the latter place probably getting 80 per cent of the shipments. It is the distributing point for the whole upper country, of which the towns of Loomis, Golden, and Oro are the principal places.

Alma is the distributing point for the Spring Coulee settlements lying back of the Pogue flat, the town of Conconully and surrounding mines, as well as the immediate surrounding country. The Catholic mission on the Indian reservation also hauls its supplies from Alma.

The mining machinery was shipped to mines near Loomis or Conconully, and consisted mostly of air compressors.

The lumber imported is the finished product, and was practically all used in Alma and Riverside. This small amount is of course no indication of the number of houses and other buildings going up in the country, as, owing to the high rates of transportation, the home product, though much inferior, is mostly used.

The country is rapidly filling up with settlers, and but little Government land, except on the upland or mountains, is now available for homesteaders. Many newcomers are awaiting the opening of the reservation, and in the meantime are renting parts of irrigated farms.

Owing to the poor transportation facilities, very little farm produce is exported and only enough is raised for home consumption. This is, however, quite a large item, owing to the development of mines in the northern part of the county and across the boundary line. Aside from mining, stock raising is the principal business.

On the north half of the Colville Indian Reservation, thrown open to settlement some years ago, considerable wheat, oats, and other grain were raised. Some of this was hauled to Riverside last fall and shipped down the river this spring by the merchants; some was hauled to the Alma gristmill and converted into flour.

On the west side of the Okanogan the land on the lower benches can all be brought under irrigation, and projects for doing so are now being considered. When this is done the land will no doubt be cut up into small holdings of 40, 20, and less acres, making room for many families. When added to this the south half of the reservation is opened to homesteaders a large increase in population and wealth of that country will no doubt result in the next few years.

There appears to be no doubt about a railroad being constructed along the northern borders of Okanogan County in the near future. It will supposedly cross the Okanogan River at or near the town of Oro and continue up the Similkameen River. It is doubtful if much benefit will be derived from this road by the lower Okanogan country in the way of transportation, except as to eastern shipments, until the road shall have reached a coast terminal, if such be the intention of the builders.

Respectfully submitted.

C. E. HANSEN,  
Overseer.

Maj. JOHN MILLIS,  
Corps of Engineers.

COMMERCIAL STATISTICS.

Pend Oreille River.

EXPORTS AND IMPORTS.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		Tons.	
Agricultural implements, etc.....			205	\$30,750
Flour and grain.....			600	19,681
Hay.....	365	\$3,910	130	1,820
Lime, brick, and cement.....	142	1,216	100	1,000
Live stock.....	120	4,000	60	5,000
Lumber and products.....	84,120	170,600	157	1,050
Wood.....	1,000	1,000		
Miscellaneous merchandise.....	2,183	37,376	792	81,100
Total.....	37,930	218,102	2,044	140,351

Six steam vessels, with an aggregate gross tonnage of 732 tons and maximum draft of 4 feet, were engaged in traffic during the year.

REPORT OF MR. C. E. HANSEN, OVERSEER.

WENATCHEE, WASH., May 29, 1905.

MAJOR: I have the honor to submit herewith the commercial statistics of Pend Oreille River for the calendar year ending December 31, 1904.

List of boats navigating Pend Oreille River during 1904.

Name.	Gross tonnage.	Length.	Breadth.	Length of route and number of trips.
		<i>Feet.</i>	<i>Feet.</i>	
Elk.....	26	52	11	20 miles. Newport to Cusick, daily the year round.
Volunteer.....	105	72	14	37 miles. Cusick to Cement Works, tri-weekly from January 1 to March 31.
Columbia.....	84	83	12	57 miles. Newport to Cement Works, twice a week, from April 1 to September 15; 52 trips. Continued making 6 trips to Usk for remainder of year.
Spokane.....	367	132	26	57 miles. Newport to Cement Works, tri-weekly, 115 trips. Navigation not closed during season.
Defender.....	75	60	12	Both boats used for towing barges with lumber. Make about 3 trips per week from the various mills to Newport. Navigation open all year excepting a few weeks in February.
Saretta.....	75	60	12	

Of the above boats the *Spokane* and *Volunteer* are of the stern-wheel class. The others are all screw-wheel boats.

The *Volunteer* struck a rock and sank the last of March; was subsequently raised, but did not run any more during the year.

The *Columbia's* run from Newport to Cement Works was interrupted September 15 by the extreme low water experienced that year; or, rather, that part of her run from Usk to Cement Works was interrupted. The upper part of the river was navigable the year round. Draft of boat without ballast, 48 inches.

The amount of freight carried by the *Elk* and *Volunteer* was estimated to be about one-third that of the *Spokane*, and was put down as miscellaneous. This was done because the information given me on application to the owners of the line was of too general a character and appeared too unreliable to be of use and further correspondence failed to elicit a more detailed statement. From the best authority it is a fair estimate.

The distance navigated by steamers is about 60 miles from Newport to Box Canyon. The principal intermediate points are Usk, Cusick, McInnis Mill, Ione, and Portland or Cement Works. Stops are also made anywhere along the river where settlers are located.

A small amount of mining machinery was shipped to the Conquest mine, some 6 or 8 miles below Newport.

The country tributary to the river is divided into meadow and timber land. Dairying is the principal industry of the meadow lands, and from the live-stock statistics it would appear to be on the increase. It will be noticed that 100 head, at an average cost of \$50 per head, were imported, while 200 head, at an average cost of \$20 per head, were exported. Evidently the imports were superior stock for dairying purposes and the exports the average beef cattle.

The meadow lands are proportionally small, extending but a few miles on each side of the Kalispell River.

The lumbering business on the river is assuming large proportions. Four sawmills were in operation during 1904. The two screw-wheel boats *Defender* and *Sareta* are engaged exclusively in logging and towing the output to Newport. The mills are looking forward to a larger output this year.

Settlement is being made all along the lower river, where two years ago there was hardly a settler.

Vacant Government land near or adjoining the river is getting scarce.

The acreage under cultivation is unimportant and, with perhaps the exception of a few fields near Usk, amounts to hardly more than a few garden patches.

There is quite a business carried on along the river by the settlers in telegraph poles and railroad ties.

The cement plant at Portland is not in operation.

Respectfully submitted.

C. E. HANSEN,  
Overseer.

Maj. JOHN MILLIS,  
Corps of Engineers.

W W 13.

#### INSPECTION OF FISH TRAPS, ETC., PUGET SOUND, WASHINGTON.

For inspecting fish traps in Puget Sound tugs have been hired as follows during the year:

Tug <i>Marian</i> , from July 1, 1904, to August 18, 1904, at \$765 per month....	\$1,224.00
Tug <i>Mariner</i> , from August 19, 1904, to October 18, 1904, at \$765 per month..	1,530.00
Tug <i>Alpha</i> , from January 3, 1905, to February 28, 1905, at \$798.50 per month.....	1,543.77
Tug <i>Alpha</i> , from May 1, 1905, to June 30, 1905, at \$798.50 per month....	1,597.00
Total.....	5,894.77

All traps have been periodically inspected during construction, while in operation, and during removal, to insure that the traps were built according to approved plans, that proper lights and fog signals were maintained on them, and that broken-off or submerged piles were not left where dangerous to navigation in removing the traps.

A revised form of permit for traps was prepared, which, in the shape finally approved, is as follows:

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
Washington, ———, ———, ———.

In pursuance of the provisions of section 10 of the river and harbor act of March 3, 1899, permission, revocable at his will, is given by the Secretary of War, on the recommendation of the Chief of Engineers, to construct and maintain a fish trap at the location shown on the attached map subject to the following conditions:

1. That the work herein permitted to be done shall be subject to the supervision and approval of the engineer officer of the United States Army in charge of the locality.

2. That a white lantern light shall be maintained on the constructing vessels or plant during the construction and removal of the trap, and on the head or outer end of the trap while the latter is in place; also such other lights shall be maintained as may be especially required by the local engineer officer to afford reasonable protection against collision by vessels with the trap. All such lights to be of approved size and power, and to be kept burning throughout each night.

3. That when deemed necessary for the safety of navigation by the engineer officer in local charge, and upon notice from him, one or more effective fog signals of approved kind and pattern shall be maintained on the trap while the latter is in place and on the construction vessels or plant during the construction and removal of the trap.

4. That provision shall be made, by watchman or otherwise, for proper attendance of lights and fog bells so that they will be at all times in effective condition.

5. That all parts of the trap which, if left standing without lights and fog signals, would be dangerous to navigation shall be completely removed at the close of the fishing season.

6. That unless the grantee has a proper license from the fish commissioner of the State of Washington, as required by the laws of the State, or if the trap herein contemplated is not actually built within eight months from the date of this consent, the same shall then be null and void; and this consent may also be declared null and void for failure on the part of the grantee, or his successor in the ownership of the trap, to comply with the conditions herein set forth, or for other sufficient cause.

7. That the local engineer officer shall be kept informed by due notices of the names and addresses of the responsible owners of the trap, and, in case the trap is owned by a firm or corporation, of the names and addresses of the individuals comprising such firm or acting as officers of such corporation; also of all transfers of ownership, and of all changes in the number of the State fishing license under which the trap is built and operated.

It is understood that this instrument simply gives consent under said act of Congress to the construction and maintenance of the structure by the grantee; that it does not authorize any injury to private property or invasion of private rights, nor any infringement of local and State laws or regulations.

A. MACKENZIE,  
*Brig. Gen., Chief of Engineers U. S. Army.*

Each permit is accompanied by a map showing the location and plan of the trap.

Revised regulations for lights and fog bells to be maintained on traps were also prepared, as follows:

UNITED STATES ENGINEER OFFICE,  
*Seattle, Wash., June 1, 1905.*

*Rules relative to lights and fog signals on fish traps, Puget Sound, Grays Harbor, and Willapa Bay and connecting waters.*

#### LIGHTS.

1. *First-class light.*—To be a No. 36 Fresnel globe anchor light 6 inches in diameter, with  $\frac{1}{8}$ -inch convex burner, securely mounted not less than 8 feet above capping of trap in such manner that the light will not be obscured in any direction from which it may be necessary for a vessel to see it.

2. *Second-class light.*—To be a Dietz cold-blast tubular lantern or equivalent, to be mounted and placed in same manner as first-class light.

3. Unless otherwise directed, all lights to be plain white or uncolored and to be placed on the outer portion of the head of the trap. All traps to have second-class lights except in cases where first-class or special lights are specified. Where first-class lights or special lights are required, special instructions will be given to trap owners.

4. All lights to be kept clean and in proper condition for burning, and to be properly attended and kept burning every night from sunset till sunrise.

#### FOG SIGNALS.

5. *First-class fog signal.*—To be a "bell-metal" or bronze bell not less than 18 inches in diameter at the opening, and to be securely mounted so as to be rung by swinging the bell bodily. Bells made of iron, steel, so-called "crystal metal," or similar com-

position will not be accepted as substitutes for the above where first-class fog signals are prescribed.

6. *Second-class fog signal.*—To be a No. 110 ship bell 10 inches in diameter at the opening, such as is used on vessels when at anchor for a similar purpose, or an equivalent.

7. Fog bells to be mounted on head of trap above capping near light and on outer end of trap unless otherwise directed.

8. All fog bells to be attended during thick weather or foggy weather, night or day, and to be rung at frequent intervals and in response to signals of vessels passing or approaching.

9. Substitutes for the prescribed patterns of first-class lights and first-class fog signals can only be allowed upon specific approval of this office, and approval will not be given for the use of lanterns or fog signals of less efficiency. Substitutes for the prescribed second-class lights and second-class fog signals must also be subject to approval.

10. Fog signals will not be required except where special instructions are given to trap owners, and the class of fog signal will then be specified.

11. If deemed necessary by this office, in special cases lights or fog signals of greater power or of distinctive characteristics may be prescribed, and in such cases the trap owner will be advised definitely of the requirements.

12. The prescribed lights and fog signals are to be maintained while the trap is in place and also either on the trap or on the constructing plant while the trap is being driven and taken out.

JOHN MILLIS,  
*Major, Corps of Engineers.*

There have been few instances of constructing traps without Federal authority and few of failure to properly comply with the requirements of the permits and the rules for lights and fog signals.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$2,748.09
June 30, 1905, allotted during the year.....	9,000.00
Amount expended during the year .....	7,738.09
Outstanding liabilities .....	870.00
Balance available.....	3,140.00

#### W W 14.

#### REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

*Wreck of schooner Challenger.*—The three-masted schooner *Challenger*, 279 gross tons, with a hold load of 3,200 barrels of lime and a deck load of lumber, was sunk in South Bend Harbor November 8, 1904. The wreck being an obstruction to navigation, and having apparently been abandoned, proposals were asked for March 2, by circular letter, for the removal of the wreck, upon authority of the Chief of Engineers of February 24, 1905, allotting \$3,000 for the purpose. The proposals were opened March 20 and the contract awarded to the Alaska Company (Incorporated), of Seattle, Wash., for the sum of \$1,995.

Work began March 25, the contractor attempting to raise the vessel by means of chains around her fastened to scows, depending on tidal action to raise the vessel. Three attempts were made, the chains parting each time. This method was then abandoned and the scheme adopted of making the hull water-tight and pumping out the water, with the idea that the flotation would be sufficient to raise the wreck.

Work on this method was begun April 4. All holes in the hull that could be found were closed up and a cofferdam 10 feet square and 22 feet high was constructed, containing an engine and 18-inch centrifugal pump. The cofferdam was placed in the after hatch and pumping was begun May 5. On account of leaks in the hull and various other causes the contractor has not succeeded in pumping out the water, and work was still in progress at the close of the fiscal year.

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CONTRACT IN FORCE DURING FISCAL YEAR.

Contractor: The Alaska Company.

Date of contract: March 22, 1905.

Date of commencement: March 28, 1905.

Date of completion: April 18, 1905.

Time of completion waived by authority of Chief of Engineers.

ENG 1905 M—161





## APPENDIX X X.

### IMPROVEMENT OF HARBORS IN THE TERRITORY OF HAWAII.

REPORT OF LIEUT. J. R. SLATTERY, CORPS OF ENGINEERS, OFFICER  
IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905, WITH  
OTHER DOCUMENTS RELATING TO THE WORKS.

#### IMPROVEMENTS.

1. Pearl Harbor, Hawaii.

| 2. Honolulu Harbor, Hawaii.

ENGINEER OFFICE, UNITED STATES ARMY,  
*Honolulu, Hawaii, July 6, 1905.*

GENERAL: I have the honor to submit herewith annual report upon  
works of improvement under my charge for the fiscal year ending June  
30, 1905. Col. Wm. H. Heuer, Corps of Engineers, was in charge of  
Pearl Harbor until April 14, 1905, and thereafter it was in my charge.

Very respectfully, your obedient servant,

J. R. SLATTERY,  
*First Lieut., Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

## X X I.

### IMPROVEMENT OF PEARL HARBOR, HAWAII.

[This work was in the charge of Col. W. H. Heuer, Corps of Engineers, to April 14, 1905.]

A description of this harbor and the approved project for the  
improvement was printed in the Annual Report of the Chief of Engi-  
neers for 1901, page 3433. No work was done during the year. There  
is no commerce yet in this harbor. While there is ample depth of  
water, the channel is so crooked and the turns so sharp that its navi-  
gation is not safe for vessels of large size. No examination for rem-  
edying this has yet been authorized by Congress. The work has been  
completed in accordance with the project and within the limits of the  
appropriation. No further funds are required.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$676.38
July 1, 1905, balance unexpended .....	676.38

#### APPROPRIATION.

March 3, 1899 .....	\$100,000
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X X 2.

IMPROVEMENT OF HONOLULU HARBOR, HAWAII.

For history and project see page 711 of this report.

A project for the expenditure of the available funds, in accordance with the terms of the act of March 3, 1905, was submitted April 17, 1905, which provides for securing bids for dredging the entrance channel to a depth of 35 feet and a width of 400 feet at mean low water, and for dredging the present harbor proper to a depth of 35 feet at mean low water for such width as available funds will permit. This project was approved May 10, 1905, and proposals for bids were advertised for June 20, to be opened July 20, 1905.

The resurvey of the harbor was commenced on May 17, and the field work completed June 30, 1905.

Money statement.

Amount appropriated by river and harbor act approved March 3, 1905..	\$200,000.00
June 30, 1905, amount expended during fiscal year, for works of improvement .....	1,202.75
July 1, 1905, balance unexpended .....	198,797.25
July 1, 1905, outstanding liabilities .....	82.64
July 1, 1905, balance available.....	198,714.61
Amount (estimated) required for completion of existing project.....	1,382,840.67
Amount that can be profitably expended in fiscal year ending June 30, 1907, for works of improvement, in addition to the balance unexpended July 1, 1905 .....	400,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897.	

APPROPRIATION.

March 3, 1905 .....	\$200,000
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COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1905.

Between Honolulu and the United States and foreign ports.

[Furnished by the collector of customs of the port of Honolulu.]

Class.	Quantity.	Value.
Receipts:	Tons.	
Food supplies.....		\$888,017
Coal.....	97,774	259,679
Spirits.....		204,760
Chemicals.....		1,172,493
Iron and steel.....		51,919
Miscellaneous.....		915,810
Total.....	97,774	3,492,678

*Between Honolulu and the United States and foreign ports—Continued.*

Class.	Quantity.	Value.
Shipments:	<i>Tons.</i>	
Sugar .....	201,847	\$14,293,063
Fruit .....		144,538
Coffee .....	720	173,751
Hides and skins .....	887	63,649
Miscellaneous .....		383,432
Total .....	202,454	15,058,433

The total of the above amounts to more than 300,228 tons, valued at \$18,551,111.

Passengers, not immigrants, arrived .....	316
Passengers departed .....	6,636

*Local commerce between Honolulu and island ports.*

This commerce to a great extent is the distribution and collection of the commerce set forth in the above list. From statements furnished by the Inter-Island and Wilder steamship companies, this commerce during the past year was as follows:

Freight (sugar, fertilizer, lumber, machinery, food supplies, etc.) .....	tons.. 237,727
Passengers carried .....	55,441

In addition to the commerce actually received at and shipped from this port, all that commerce between the United States and the Orient and Australia carried by ships calling at this port is directly and equally benefited by this improvement, safer and speedier entrance and exit being afforded the ships carrying it. The value of this commerce—as stated by the collector of customs of San Francisco—during the past year amounted to \$45,897,753.

## PLAN AND ESTIMATE OF COST OF IMPROVEMENT.

HONOLULU, HAWAII, *December 19, 1904.*

GENERAL: Complying with your cablegram of this date, I have the honor to submit the following report on the proposed improvement of Honolulu Harbor:

1. The harbor consists of an inner basin, formed and perfectly sheltered by a coral reef, through which there is a narrow channel leading into the inner basin and approximately at right angles to it.

2. Considerable work has been done from time to time by former governments of Hawaii, so that now the entrance channel has a depth of from 30 to 35 feet for a width of 200 feet, and the inner basin a depth of from 25 to 30 feet for a width of about 800 feet. While the harbor thus formed was large enough to accommodate ships formerly frequenting this port, it is altogether inadequate for the larger ships of to-day. With the constant tendency to still larger ships it will become still more inadequate, and unless a considerable enlargement is undertaken it seems probable that the large ships will cease calling at this port, due to the inconvenience and the risk of entering, thereby depriving the port of valuable business. The newest ships on the Pacific, the *Mongolia* and the *Manchuria*, are unable to enter the harbor when at all heavily laden, but are compelled to lay outside the harbor entrance. All ocean liners have considerable difficulty in turning around upon leaving their wharves.

3. Appended hereto is a statement furnished by the Honolulu Chamber of Commerce of the foreign commerce of this port, and also a list of the vessels which called at the port during the fiscal year ending June 30, 1904. To the commerce there set forth is to be added the local commerce between Honolulu and the other islands of the group. From information furnished by the local steamship companies this commerce for the past year is estimated to have amounted to 321,214 tons of freight and 60,528 passengers. This would make the total commerce for the past year amount to 545,895 tons of freight, valued at approximately \$38,000,000, and 73,371 passengers. In addition to this the great commerce passing through this port between the United States and the Orient and Australia would also be directly benefited by the improvement of the harbor, and should therefore be considered as a portion of the commerce to be benefited by the proposed improvement.

4. With the opening of the Panama Canal a considerable increase above the present commerce can be reasonably expected. The establishing of an extensive naval station and extensive fortifications will still further add to the importance and prosperity of the port.

5. From a careful consideration of the above facts the following improvements, in my opinion, are necessary and fully warranted by the present and reasonably prospective commerce to be benefited thereby, to wit:

(a) The entrance channel to be dredged to a depth of 35 feet and a width of 400 feet at mean low water.

(b) The inner harbor to be deepened to 35 feet at mean low water and enlarged so as to provide an area at least half as great again as the present area.

(c) The easing of the curve where the entrance channel joins the inner harbor.

(d) New front range light, properly located for entering the harbor.

The proposed improvements are shown on the working map accompanying this report. This map was compiled from the most recent information available, and, within the limits of the proposed improvement, is believed to closely agree with existing conditions. Information as to the probable character of material that would be encountered in the proposed improvement and the probable cost of removing it was obtained from the dredge captain, who has done a great amount of this dredging work up to this time. Inquiries were also made as to the materials encountered at the few places where borings have been made. The information obtained from this source, however, was too meager to be of material value.

Section A includes the channel from the break in the reef to the inner harbor.

Section B includes approximately the inner harbor as bounded by present harbor lines.

Section C includes the proposed enlargement.

The material to be removed from sections A and B is of soft mud and sand.

In section C it is believed that alternating layers of mud and sand and coral rock will be encountered in some places, while in others nothing but mud and sand will be found.

The estimated cost of the proposed improvement is as follows:

Section A, 674,745 cubic yards of mud and sand, at 30 cents.....	\$202,423.50
Section B, 999,008 cubic yards of mud and sand, at 30 cents.....	299,702.40
Section C:	
558,523 cubic yards of mud and sand, at 30 cents .....	167,556.90
558,523 cubic yards of mud and sand, at \$1.50 .....	837,784.50
	<hr/>
	1,507,467.30
Contingencies, 5 per cent .....	75,373.37
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Total .....	1,582,840.67
Estimated cost of new front range light.....	30,000.00

A portion of section C, as indicated, consists of submerged land, belonging to the Dowsett Company, Limited. The enlargement of the harbor at this point is recommended, subject to the condition that this land be obtained without cost to the United States.

In order to execute this work economically it is desirable that American dredging companies should compete with the Hawaiian companies, and it is therefore urgently recommended that in event of improvement a contract for the entire work be authorized. The necessary competition can not be hoped for unless this is done.

Very respectfully,

J. R. SLATTERY,  
*First Lieutenant, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Corps of Engineers, U. S. A.*



## APPENDIX Y Y.

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### ANNUAL REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS FOR THE FISCAL YEAR ENDING JUNE 30, 1905.

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,  
*Washington, D. C., August 31, 1905.*

GENERAL: 1. The Board of Engineers for Rivers and Harbors has the honor to submit the following report of its operations during the fiscal year ending June 30, 1905. Information concerning the organization of the Board and its duties, as fixed by the act approved June 13, 1902, was contained in the Board's Annual Report for the fiscal year ending June 30, 1904, and is therefore not included herein.

2. On June 30, 1904, the Board consisted of the following-named officers of the Corps of Engineers: Lieut. Col. A. M. Miller, Lieut. Col. R. L. Hoxie, Maj. Edward Burr, Maj. H. C. Newcomer, Capt. W. V. Judson. Since that date the following changes have occurred in the personnel of the Board:

August 13, 1904. By Special Orders, No. 28, Office of the Chief of Engineers, Maj. S. W. Roessler relieved Maj. H. C. Newcomer, and was subsequently designated as executive officer of the Board.

September 2, 1904. By Special Orders, No. 31, Office of the Chief of Engineers, Lieut. Col. D. W. Lockwood was appointed a member of the Board, vice Capt. W. V. Judson, who was then on duty as military attaché of the United States accompanying the Russian army.

Through the sudden death of Colonel Miller, on September 14, 1904, the Board lost its senior member.

October 31, 1904. By Special Orders, No. 42, Office of the Chief of Engineers, Capt. Charles W. Kutz was detailed as a member of the Board.

3. Of the 154 preliminary examinations and 16 miscellaneous subjects included in the act of June 13, 1902, on which the Board was required to report, but one case remained for final action at the close of the last fiscal year. This was temporarily held up awaiting estimates from the district officer. The pressure of work being relieved, the Board was enabled to give attention to the accumulation and compilation of data bearing upon the commerce involved in existing projects for river and harbor improvement, and to get into closer touch with reliable sources of information. Its study of the economic aspects of public expenditures for improvement of harbors and waterways convinced the Board that every possible effort ought to be made to embody in reports on preliminary examinations ample data concerning



the commerce involved, and it therefore addressed a letter to the Chief of Engineers, United States Army, submitting its views on this subject. There was also prepared in the office of the Board a table giving data bearing upon the cost, commerce, etc., involved in the more important river and harbor projects throughout the United States.

4. In compliance with resolutions of the Committee on Rivers and Harbors of the House of Representatives, and instructions from the Chief of Engineers, United States Army, the Board gave consideration to the following subjects:

Galveston ship channel and Buffalo Bayou, Texas.  
 Black Rock Harbor, New York.  
 Puyallup Waterway, Tacoma Harbor, Washington.  
 Muskingum River, Ohio, rebuilding of Lock and Dam No. 11.  
 Bayou Teche, Louisiana.  
 Harlem Kills, New York.  
 Connecticut River, between Hartford, Conn., and Holyoke, Mass.

5. Owing to the magnitude and importance of these improvements, the Board's consideration of the questions involved was necessarily conducted with great care and consumed considerable time. At the close of the fiscal year but one of these cases—Harlem Kills, New York—remained for final action and report.

6. The act of March 3, 1905, extended the duties of the Board by providing that—

\* \* \* said Board shall also, on request by resolution of the Committee on Commerce of the United States Senate, or the Committee on Rivers and Harbors of the House of Representatives, examine and review surveys provided for by acts or resolutions prior to the river and harbor act of June thirteenth, nineteen hundred and two, and report thereon.

7. The same act made provision for the usual preliminary examinations and surveys, as well as other examinations pertaining specifically to appropriation items, and required that all such reports shall in future be referred to this Board for consideration. Of the 156 preliminary examinations ordered by the act, there had been referred to the Board on June 30, 1905, 35 reports, on 10 of which the Board had taken final action, and 18 were outstanding awaiting surveys, the remaining 7 cases being under consideration.

8. In connection with its consideration of the various subjects referred to it for report and recommendation, the Board gave hearings to interested parties, and made inspections as follows:

At Houston, Tex.: Public hearing with reference to the Galveston Ship channel and Buffalo Bayou improvement. The locality was inspected.

At the office of the Board: Hearing with reference to the improvement of Black Rock Harbor, New York.

At the office of the Board: Hearing with reference to the improvement of the Muskingum River.

At Montgomery, Ala.: Public hearing with reference to the Coosa and Alabama rivers, of which a survey was ordered in section 1 of the river and harbor act of June 13, 1902. An inspection was made of the upper Coosa.

At Metropolis, Ill.: Public hearing with reference to a preliminary examination of the Ohio River at and near Metropolis.

A committee of the Board made an inspection of the Connecticut River with reference to the improvement thereof between Hartford and Holyoke.

9. Expenses of the Board during the fiscal year may be briefly summarized as follows:

Rent of offices.....	\$1,440.00
Salaries of civilian assistants .....	4,087.50
Mileage and traveling expenses .....	1,170.80
Miscellaneous.....	97.00
Total.....	8,802.30
* * * * *	*

For the Board:

Very respectfully,

D. W. LOCKWOOD,  
*Lieut. Col., Corps of Engineers,*  
*Senior Member of the Board.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*



## APPENDIX Z Z.

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### SUPERVISION OF THE HARBOR OF NEW YORK.

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*REPORT OF COMMANDER H. H. HOSLEY, U. S. NAVY, FOR THE FISCAL  
YEAR ENDING JUNE 30, 1905.*

WAR DEPARTMENT,  
OFFICE OF SUPERVISOR OF HARBOR OF NEW YORK,  
*New York, July 17, 1905.*

GENERAL: I have the honor to submit the following report of the operations of this office for the fiscal year ending June 30, 1905, and to submit an estimate of the amount required for the fiscal year ending June 30, 1907.

As I relieved Commander D. D. V. Stuart, U. S. Navy, as supervisor of the harbor, on July 13, 1904, this report is made from my own observation for practically the entire fiscal year.

No material changes have been made in the system and methods inaugurated and improved upon by my predecessors in office. Every effort has been made to prevent illegal deposits in the harbor and its tributary waters. The patrol boats have been kept constantly on the alert, and it is believed that the willful violations of the law have been comparatively few. Owing to the unusual quantity of ice in these waters during the past winter, a number of accidents occurred that resulted in sinking of scows, and consequent short dumping. Owing to work on the subways, tunnels, and new railway stations, there has been a great deal of refuse material to be disposed of in addition to the dredgings resulting from the many operations under way for deepening the channels leading to and about the harbor, and extensive improvements about the docks.

That any of this material should have to be sent to sea and dumped off the mouth of the harbor is most regrettable, considering the vast amount of partially submerged land capable of being easily transformed into valuable property that is lying right at the gates of the city. It is to be hoped that the time is not far distant when it will be realized by the capitalists that the reclaiming of these many acres of land would be a most sound business investment.

During the past year quite a large amount of the refuse has been utilized in the improvements at Governors Island, Rikers Island, railroad termini at Greenville and Port Liberty, and the filling in of Hackensack Meadows and along the west shore of Newark Bay, as is shown in the recapitulation near the end of this report.

All the material sent to sea has been deposited to the eastward of Scotland light-ship. Soundings are taken once a month, and care will be taken to preserve plenty of water in that locality, but it is only a question of time when the dumpers will have to go farther to sea before discharging their loads.

The city's crematory for the final disposition of garbage on Barren Island has continued its operations throughout the year.

A great deal of attention has been paid to the disposal of ashes from tugs and other harbor craft. Through the hearty cooperation of the city authorities, there are now seven scows located at various points in the harbor; the New York, New Haven and Hartford Railroad maintains two more. These, taken in connection with the many city dumping boards for the reception of ashes and cellar dirt, make it comparatively easy for the harbor craft to get rid of their ashes, and, as a result, the legal disposition of these ashes is much more prevalent than in former years. The officials of the principal railroad corporations operating tugs in these waters have been most cordial in their cooperation with me in this matter. These ashes, amounting to about 40,000 cubic yards, were removed by a contractor and utilized in filling in behind bulkheads, principally in the small coves of Westchester County.

While the general tendency on the part of the contractors is to fully carry out the law in reference to illegal deposits, I find that many of the towboat captains are disposed to evade the law if possible and dump short, the favorite excuses being deranged mechanism of the dumping scows, irresponsible scowmen, and mistaken signals. Many cases are detected, and, if circumstances warrant, the facts with necessary witnesses are sent to the United States district attorney. When the work is being done for the Government or the city—and in a few cases for private corporations—it has been found that it is possible to consider that the towing company has failed to carry out its contract, and that the contractor has also failed to have the refuse legally deposited, and therefore the contractor does not get paid for his dredging, and he naturally does not pay the towing company for that particular tow, and thus the practice of short dumping has materially decreased. In case of faulty working of dumping scows, the same means are adopted in regard to checking the dredging against the contractor, and in addition permits for such faulty scows are withheld until the necessary repairs have been made.

During the past fiscal year checkages under this heading have been as shown in the following table:

	Cubic yards.
United States Engineer Department .....	1, 261
Department of docks and ferries.....	11, 381
Department of street cleaning .....	1, 100
Total.....	13, 742

at an estimated average of 35 cents per cubic yard, amounting to \$4,809.70.

Under the same contracts 286½ pocket loads (averaging 150 cubic yards each, or a total of 42,975 cubic yards) were noted by the patrol boats as taken out to sea, where, failing to clear at the proper place of deposit, they were kept under surveillance until returned to the original point of loading and there deducted before reloading. This

amount of material would have proved a large item of gain to the contractor could it have been disposed of on the way in without the knowledge of this office and before reaching the supervision of the parties for whom the work was done, the contractor not only having to bear the expense of retowing it to sea, but very frequently having to dredge it before being able to properly dispose of it.

Owing to the congested state of affairs in the United States district court for this district, the result of arrests and proceedings in the cases of illegal dumping sent up before this court has been most unsatisfactory. The five cases pending at the close of the fiscal year ending June 30, 1904, have not yet been tried; and during this year seven more have been sent up to this court, one case only (*U. S. v. P. Sanford Ross, Incorporated*) having been closed, by the defendants pleading guilty and paying fine. The others, being all palpable violations of the law, should be punished. Failure to bring about conviction and punishment is most detrimental to this service; the tug masters become indifferent, as they feel that punishment will not be forthcoming in case the law is violated. I am informed by the United States district attorney that the delay has been brought about by the repeated trials that have arisen on account of the burning of the steamer *General Slocum*, and that the cases sent up from this office will probably be tried during the next October term. It is to be hoped that this will be done, as delay is most hazardous; witnesses become dispersed, and the lapse of time renders testimony less strong and convincing, and, as a result, an acquittal or a *nolle pros.*, either of which is encouraging to those whose tendencies are not those of a strictly law-abiding citizen.

Fortunately, the dumping of foreign matter in the waters of New York Harbor is an offense against municipal law, and, through the courtesy of the district attorney of the county, action has just been taken in one case of dumping ashes from a yacht at anchor in East River; in this way the case will be tried at once before a magistrate; this is sure to have a most beneficial effect.

Below will be found a recapitulation of the cases now pending before the courts:

Continued from last year.....	5
Sent up to United States court this year.....	7
Sent up to county criminal court .....	1

The vessels of the patrol fleet have had an exceptionally busy time of it during the past year on account of the unusually large quantity of refuse material to be watched, and an extraordinarily large amount of ice during the winter has made the duty very arduous and the wear and tear of the vessels incident to the service considerably in excess of the normal. They have, however, been sent to the shipyards from time to time as their services could be spared, and as a result all of them with the exception of the *Vigilant* and the *Argus* are now in very good condition. The *Vigilant* will be put in good condition early in July, bids for her repair having already been opened.

The tug provided for in sundry civil bill approved March 3, 1903, and for which a contract was signed by my predecessor in office and the shipbuilding firm of John H. Dialogue & Son, of Camden, N. J., was launched on September 24, 1904, and was named *Cerberus*. After many delays on the part of the builder the vessel was delivered here on March 12, 1905. She has been in use since that date, but, owing to

certain details in which the terms of the contract had not been adhered to by the contractor, final payment was withheld until the specified defects were remedied. The contractor has within the past fortnight made good these defects, and the vessel will be finally accepted and the last payment made during the coming month. That a penalty clause did not appear in the contract was most unfortunate, as the vessel should have been delivered on September 9, 1904, since which date the Government has had practically no redress against the procrastinating policy of the contractor.

The *Argus* has been laid up in charge of a ship keeper since the delivery of the *Cerberus* on account of lack of funds, but on July 1 she will be put in service, and my intention is to so keep her during the summer months while operations of the contractors are most active.

Many small private operations of dredging are under way in the waters of Newark Bay, the Passaic and Hudson rivers, and Long Island Sound, and it is my purpose to keep as close a watch as is possible upon these operations.

While the *Argus* is an old vessel and is not suitable for service in outside waters, I hope to utilize her for a while in the work outlined above.

In this connection I am of the opinion that the duty of supervising these operations could be done much more satisfactorily and very much more economically by two or three small motor boats chartered for the summer months. The *Argus*, although the smallest of the patrol fleet, is unable to work close in shore, where much of this work is going on. She requires a crew of at least 6 men and an expenditure of about \$800 a month. Experience has persuaded me that the temporary appointment of inspectors familiar with the localities, and chartering for their use for a few months small motor boats operated by one man is the proper way to carry out the supervision of this class of work; better results would certainly be obtained, closer espionage would be maintained, and at a decreased cost. By adopting this method the *Argus* could be sold, it being a needless expenditure of money to keep her tied up in charge of a ship keeper during the winter months, when the ice in the harbor makes it hazardous to put the vessel in service; and it will be but a very short time before the vessel will be beyond repair and would realize but very little if sold by auction.

The subject of shad poles and nets as menaces to navigation has received a great deal of attention, and as a result they have been kept out of the channels for deep-draft ships and those located in shallow water are being regulated and systematized under the direction of the engineer officers locally in charge.

Owing to the vast amount of work being done by the city on its new wharves and ferry slips and the utter disregard of the law on the part of some of the contractors engaged in the work, a great number of old piles and other timbers find their way into the waters of the harbor, and endanger the propellers and paddle wheels of steamers. Accidents from fouling these obstructions are numerous, the patrol boat *Argus* having totally disabled her propeller twice within a month through encountering floating timber at night when on patrol duty. Every effort has been made to detect somebody in the act of setting these timbers adrift, but so far it has been found impossible to get a case that would insure conviction. In the efforts of this office to detect offenders every possible aid has been rendered by the munici-



pal police through the courtesy of the police commissioner. A very large number of the old piers are being torn out, and the contractors are required to raft the old piling and other lumber and then remove it. The rafting is done after a fashion, and then during the night the lashings carry away, the component parts of the raft find their way into the harbor, and the contractor always has a man ready to prove that he removed the raft in a legal manner, either by water or by land. Thus it is impossible to make out a good case unless the offender is absolutely detected in the act. A few convictions would undoubtedly check this nuisance, and it is hoped that before long some clear cases will develop. •

The matter of interference with navigation by vessels engaged in towing using excessively long towlines has very rightly been most seriously considered, and most unfortunately no relief has been obtained. The question is a very serious one, and traffic in these waters is delayed and endangered through the use of these long towlines, in many cases the length of the tow being over half a mile. Complaints from steamship owners with regard to the use of such long towlines have been frequent for many years. Both Houses of our Congress have at times introduced bills looking toward an abatement of the trouble, but thus far there has been no enactment regulating the use of towlines. It is to be hoped that it will not be long before something will be done to better the conditions. Towlines of the length used and advocated by some of our towing companies would never be allowed in inland waters elsewhere, and in the interests of speed and safety to the traveling public they should not be allowed in these inland waters. Towboats should be obliged to shorten up at the lightships on coming from sea, at Execution Rock on approaching from the Sound, and off Fort Washington when descending the Hudson River. At present, with no law governing this matter, lines of entirely too great length are used; and as a result passenger steamers of all classes, including ferryboats and excursion steamers carrying hundreds of lives, are delayed and endangered and buoys and other aids to navigation are being constantly fouled and moved from their proper positions, and thus adding to the dangers arising from the use of such long towlines in these waters, where traffic is congested. Some solution of the question is imperative, as delay, danger, and disaster to the public at large are sure to follow the cupidity and lack of consideration for the general public that is shown by those engaged in towing in these waters.

The following is a synopsis and status of the cases of illegal dumping which have been referred to the United States district attorney with recommendation that proceedings be instituted against the parties liable.

#### CASE AGAINST THE TUG FIDELITY.

[Nells Jansen, master; Conrad Anderson, scowman, and Albert Hastorf, owner of dumper.]

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1904, Appendix Y Y, page 3688.

June 1, 1904: Indicted in circuit court of southern district of New York for dumping in New York Harbor in violation of section 1, act of June 29, 1888, and section 3, act of August 17, 1894 (1 Supp. R. S., p. 594, and 11 Supp. R. S., p. 249).

June 15, 1904: Defendants pleaded not guilty and the case went over to the October term.

June 30, 1905: Case pending.

CASE AGAINST THE TUG SENATOR RICE.

[William N. Lewis, master; Gaetano Rotundo, scowman, and Jacob Rice, owner.]

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1904, Appendix Y Y, page 3689.

June 21, 1904: Warrant issued by United States Commissioner John H. Shields for violation of the foregoing acts. Defendants arraigned same day.

September 27, 1904: Defendants were indicted.

October 14, 1904: Rotundo pleaded not guilty.

October 20, 1904: Rice and Lewis pleaded not guilty.

June 30, 1905: Case pending.

CASE AGAINST THE TUG JOHN FLEMING.

[William Kelly, master; Ben Manego and August Jacobsen, scowmen.]

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1904, Appendix Y Y, page 3689.

June 21, 1904: Warrant issued by United States Commissioner John H. Shields for violation of the foregoing acts. Defendants arraigned same day.

September 27, 1904: Defendants were indicted.

October 17, 1904: Jacobsen pleaded guilty, and sentence was suspended. A nolle pros. was entered by the direction of the court as to the other two defendants.

CASE AGAINST THE TUG WM. H. FLANNERY.

[John Clark, master; William H. Flannery and Thomas Flannery, owners, and Domenico Fidele, scowman.]

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1904, Appendix Y Y, page 3689.

June 21, 1904: Warrant issued by United States Commissioner John H. Shields for violation of the foregoing acts. Defendants arraigned same day.

September 27, 1904: Defendants were indicted.

October 20, 1904: Defendants pleaded not guilty.

June 30, 1905: Case pending.

CASE AGAINST THE TUG JOHN D. DAILEY.

[John C. West, master; Christ. Kristofferson and Hans Nelson, scowmen.]

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1904, Appendix Y Y, page 3690.

June 21, 1904: Warrant issued by United States Commissioner Shields for violation of the foregoing acts. Defendants arraigned same day.

September 27, 1904: Defendants were indicted.

June 30, 1905: Case pending.

CASE AGAINST THE TUG JOHN FLEMING.

[Brown & Fleming Contracting Company, owners; William Kelly, master; August Jacobsen, scowman.]

This tug proceeded to sea on October 23, 1904, with dumper *No. 38E* fully loaded with cellar dirt, passing Owls Head bound out about 10.55 a. m. of that date.

This tow was sighted by the patrol boat while passing through the east channel for Scotland light-ship. The scow was then found to be in a sinking condition, with port side under water to coaming of the pockets. When the tow was bearing E. S. E., about a mile and a half

from buoy 2, east channel, the scow was on her beam ends, and in order to prevent her sinking her contents were discharged. The scowman stated that she had been in a leaking condition for the preceding two weeks, and that he had so reported to the superintendent of the company, but that nothing had been done.

As this seemed a clear case of illegal dumping due to the employment of unseaworthy vessels, the case was referred to the United States district attorney for his action on October 30, 1904, with the suggestion that the proceedings should be entered against the owners.

December 13, 1904: Defendants were indicted.

June 30, 1905: Case pending.

#### CASE AGAINST THE TUG H. G. RUNKLE.

[Willis G. Hill, master; Andrew Hansen, scowman.]

In this case the tug *Runkle* proceeded to sea with dumper No. 022 fully loaded with mud, passing the fort bound out about 2.10 a. m. of December 7, 1904.

About 7 a. m. the patrol boat sighted the tug *Runkle* with dumper No. 022 on the east bank, bearing E. S. E. one-half mile from buoy No. 6, east channel, scow empty. The master of the tug stated that the scow grounded off buoy 2, and that the scow was dumped in order to get her off.

As this seemed to be a clear case of illegal dumping due, in my opinion, to poor judgment on the part of the master of the tow, the case was referred to the United States district attorney for his action December 7, 1904.

December 7, 1904: Warrant issued.

June 3, 1905: Case pending.

#### CASE AGAINST THE TUG JAMES A. LAWRENCE.

[The Morris & Cumings Dredging Company, owners of dumpers; Charles Hart, master; Olaf Olsen, scowman of 18M, and John Nutson, scowman of 37M.]

The tug *James A. Lawrence* proceeded to sea with three dumpers, Nos. 18M, 19M, and 37M, fully loaded with mud, passing the fort bound out about 4.55 a. m., November 29, 1904.

This tow was inspected while passing Owls Head bound in about 11.30 a. m. of that date and found to be in the following condition: No. 18M empty, 19M fully loaded, 37M two pockets empty and two loaded.

It was ascertained that the tow had not proceeded farther than Gedney channel when, as the master of the *Lawrence* states, he noticed dumper No. 37M was about to capsize and he put about, and that when he got near buoy No. 6 in the East channel he pulled over on the east bank and gave orders to scowman of No. 37M to knock out two pockets so as to save the scow from capsizing. It also appears that the scowman of dumper No. 18M dumped the entire contents of his scow at the same time.

Dumper No. 18M was inspected and found to have about 6 inches of water and the forward hatch not fastened, neither had it any canvas. Dumper No. 37M had forward hatch broken and about 6 inches of water.

The permit was issued upon the application of the Morris & Cumings Dredging Company, and as I am of the opinion that the scows were not in a seaworthy condition and that the tug took more dumpers in tow than she could safely handle, the case was referred to the United States district attorney with the suggestion that proceedings be instituted against the owners of the dumpers December 8, 1904.

December 8, 1904: Defendants arrested and arraigned.

February 8, 1905: After several hearings before the commissioner, the complaint was dismissed as to Olsen and Nutson.

March 7, 1905: The Morris & Cumings Dredging Company and Charles Hart were indicted by the grand jury.

June 30, 1905: Case pending.

#### CASE AGAINST THE TUG COLONEL GAYNOR.

[William A. Kinyon, master; Toney Romer, scowman.]

The tug *Gaynor* proceeded to sea with dumpers *Nos. 1R* and *57Z*; *57* being fully loaded with mud, and *1R* having five pockets loaded with mud and one pocket empty; December 7, 1904.

The master of the patrol boat states that while inspecting the scow he blew his whistle three or four times to get the scowman of dumper *No. 1R* up; when he came on deck he was asked if the pocket was empty when he started; he replied, "Yes." When the patrol boat drew off a little the scowman went forward and knocked out the first forward pocket, the tow at that time being off Engineers dock, Fort Wadsworth.

As this seemed a clear case of illegal dumping, aggravated by the fact that the deposit was made just below the Narrows, and in my opinion due to the employment of a scowman who was incapable, ignorant of the signals, and unable to understand our language, the case was referred to the United States district attorney for his action December 8, 1904.

January 26, 1905: Defendants were indicted.

March 8, 1905: Defendants pleaded not guilty.

June 30, 1905: Case pending.

#### CASE AGAINST THE TUG BEE.

[R. G. Packard Co., owners; Charles Carlsen, master; George Benson, scowman.]

The tug *Bee* proceeded to sea with dumpers *Nos. 016* and *018* fully loaded with mud, passing the fort bound out about 6.55 p. m., December 15.

At about 10.05 p. m. this tow was sighted by the patrol boat at a point 2 miles northwest of the Scotland light-ship, when it was found that *No. 016* was entirely empty.

The scowman stated that he being afraid of the scow sinking, on account of the heavy easterly sea running, waved his lantern to call the attention of the captain of the towboat, who ran alongside of scow and gave him an order to dump.

As this seemed to be a clear case of violation of law on the part of the master of the tug, the papers were respectfully referred to the United States district attorney for his action December 16, 1904.

January 10, 1905: Defendants were indicted.

June 30, 1905: Case pending.

## CASE AGAINST THE TUG E. K. ROSS.

[P. Sanford Ross (Incorporated), owners; H. Quillen, master; and Emil Van Brussel, scowman.]

The tug *E. K. Ross* proceeded to sea with dumpers *Nos. 7S* and *33S* loaded with mud, passing the fort bound out about 11 p. m., February 9, 1905, the contents of the first forward and first after pockets of dumper *No. 7S* being discharged between buoys 2 and 4 of the Swash channel. There was a heavy sea running and a fresh wind blowing from the N.N.E. The weather at the time was such as to make it extremely hazardous for a towboat with two loaded dumpers to safely make the trip to the designated point of deposit, and as dumper *No. 7S* was being towed stern first, the seas were washing so heavily over the entrance to the cabin that the scowman was unable to reach it, and the scow being in imminent danger of sinking, the scowman discharged the material in the pockets above referred to.

As in my opinion the proceeding to sea in the face of such hazardous weather, and the handling of the tow, showed extremely poor judgment, the case was referred to the United States district attorney for his action on February 9, 1905.

March 7, 1905: Defendants were indicted.

March 8, 1905: The P. Sanford Ross Company (Incorporated) pleaded guilty and was fined \$250, which fine was immediately paid into court. Under the direction of the court, the indictment was nolle as to the other defendants.

## CASE AGAINST THE TUG JOHN FLEMING.

[Brown & Fleming Contracting Company, owners; Fred. Bouchard, master; Joseph Spragga, scowman.]

This tug proceeded to sea on April 22, 1905, passing the fort bound out about 1.05 p. m. of that date. When about off Sandy Hook Point at 2 p. m., the captain of the *Fleming* blew his whistle as a signal for the scowman on the *Suir* to lengthen the hawser. The scowman being unfamiliar with the signals, also with the location of the dumping ground, dumped the contents of the first forward, forward middle, and after middle pockets, the tow at that time being about 3 miles NW.  $\frac{1}{2}$  N. of the light-ship, and in the South channel.

The patrol boat *Scout*, then on outside duty, saw this illegal deposit, ran alongside the *Fleming* and advised the captain that it would be necessary for him to place the scowman under arrest.

After a thorough investigation of this case it seemed clear that this illegal dumping was due to ignorance on the part of the scowman, who was neither familiar with our language nor the signals and had absolutely no knowledge of the place for the deposit of material in his scow, and the case was referred to the United States district attorney for his action April 22, 1905.

April 24, 1905: Scowman held to answer in complaint, preliminary hearing before Commissioner Shields May 8, 1905.

May 8, 1905: Adjourned until July 6.

June 30, 1905: Case pending.

There has been moved and deposited outside the harbor, at properly designated places and behind bulkheads in the neighborhood of New York, during the fiscal year ending June 30, 1905, the amount of

20,707,889 cubic yards of material—mud, city refuse, garbage, cellar dirt, ashes, lime, and other material—as per the following recapitulation:

Place of deposit.	Kind of material.	Amount.
		<i>Cubic yards.</i>
Scotland lightship .....	City refuse, mud, etc .....	14,819,099
Long Island Sound .....	Mud, shells, etc .....	905,664
Fisher's Island Sound .....	do .....	2,490
Hudson River .....	Dirt, ashes, mud, etc., behind bulkheads and on shore for filling.	750,737
East River .....	do .....	1,428,355
Harlem River .....	do .....	19,126
New York Bay .....	do .....	286,821
New York Bay (P. R. R. Co., Greenville) .....	do .....	1,077,657
New York Bay (C. R. R. Co. of New Jersey, Port Liberty).	do .....	191,630
Staten Island Sound .....	do .....	276,047
Newark Bay .....	do .....	118,799
Passaic River .....	do .....	337,106
Hackensack River .....	do .....	4,451
Shrewsbury River .....	do .....	139,266
Raritan River .....	do .....	200
South River .....	do .....	250
Jamaica Bay .....	do .....	2,792
Barren Island .....	Garbage, dead animals, offal, etc., on shore for reduction.	347,400
Total .....		20,707,889

Permits issued, 10,996.

From the foregoing statement it will be seen that 14,819,099 cubic yards of mud, street sweepings, cellar dirt, etc., were deposited near the mouth of the harbor; 905,664 cubic yards of dredging spoils deposited in Long Island Sound, a large percentage of which, principally sand and shells, was utilized for the propagation of oysters, being scattered over oyster beds under supervision of the shell fish commission of the State of Connecticut; 2,490 cubic yards of mud, etc., deposited in Fisher's Island Sound; 4,633,236 cubic yards of cellar dirt, ashes, and other inoffensive material were used for filling in behind bulkheads, and 347,400 cubic yards of garbage, dead animals, offal, etc., were deposited on Barren Island for reduction.

The following is a statement of the appropriation for "Prevention of Deposits, Harbor of New York, 1905:"

For pay of inspectors, deputy inspectors, office force, and expenses of office .....	\$10,260.00	
Expended to June 30, 1905 .....	\$9,250.00	
Outstanding liabilities .....	956.84	
	<u>10,206.84</u>	\$53.16
For pay of crews and maintenance of 6 steam tugs and 1 launch .....	63,000.00	
Expended to June 30, 1905 .....	\$57,854.32	
Outstanding liabilities .....	5,011.30	
	<u>62,865.62</u>	134.38
Balance .....		<u>187.54</u>
"Prevention of Deposits, Harbor of New York, 1904:"		
For purchase or construction of 1 steam tug .....	\$45,000.00	
Expended to June 30, 1905 .....	\$34,158.57	
Outstanding liabilities .....	9,582.00	
	<u>43,740.57</u>	
Balance .....		<u>1,259.43</u>



The following is an estimate of appropriation required for service of the fiscal year ending June 30, 1907, by the supervisor of the harbor:

Detailed objects of expenditure and explanations.	Estimated amount that will be required for each object.	Amount appropriated for fiscal year ending June 30, 1906.
Prevention of obstructive and injurious deposits within the harbor and adjacent waters of New York City:		
For pay of inspectors, deputy inspectors, office force, and expenses of office.....	\$10,260	\$10,260
For pay of crews and maintenance of patrol fleet (6 steam tugs and 1 launch) .....	75,000	65,000
For general repairs and overhauling patrol vessels.....		10,000
Total.....	85,260	85,260

Very respectfully, your obedient servant,

H. H. HOSLEY,  
*Commander, U. S. Navy, Supervisor.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*





## APPENDIX A A A.

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### ANNUAL REPORT OF THE CALIFORNIA DÉBRIS COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 1905.

CALIFORNIA DÉBRIS COMMISSION,  
*San Francisco, Cal., July 14, 1905.*

**GENERAL:** The California Débris Commission has the honor to submit the following annual report for the fiscal year ending June 30, 1905:

After the first discovery of placer gold in California, when the methods of mining were primitive and simple, the operation of mining gold developed in the few years following from the old hand rocker and familiar pan to the wholesale demolition of acres of ground by the aid of powerful hydraulic streams. Placer gold, lying as it usually does in gravel deposits of old river channels, is easily secured when located by the sorting action of flowing water. This has given rise to the use of streams of water carrying great quantities and under great pressures both to break down banks of gold-bearing gravel and to wash the entire bank so eroded through sluice boxes, where the gold is caught by reason of its greater weight in riffles or by various other devices. It thus happened that since the discovery of gold in California enormous quantities of gravel, sand, and clay have been washed down from the mountains and higher levels whenever sufficient water could be obtained and the amount of gold warranted. For this purpose ditches many miles long were constructed at heavy expense to carry water to gold-bearing gravel deposits. In some localities whole hillsides have been washed off to the bed rock, the débris resulting therefrom passing into the rivers and natural water courses. In the early stages of placer and hydraulic mining in California no particular attention was paid to the effect that the dumping of mining débris in the near-by canyons would have upon the river channels and adjacent lands in the valleys below. The débris from these operations first found lodgment in the gulches and beds of the small streams in the vicinity of the mines. Later it was carried by the ordinary flow of the streams, but principally by the winter freshets, farther down into the larger streams, the high waters of each succeeding year adding to the deposit in the lower streams. This has caused the rivers to partially fill up to the detriment of navigation, and in times of high water has caused them to overflow their banks to the damage of the adjacent farm lands. The dimensions of the phenomenon wrought by the unrestricted hydraulic mining operations became enormous. Legal action was finally taken by the farmers in the lower valleys for their protection and the cases carried to the courts. These resulted in injunctions against dumping débris in the streams and ravines, which had the effect of practically

prohibiting all hydraulic mining. Opposed to the farmers and those interested in protecting streams and adjoining lands were the mining interests, which, it has been estimated, had over \$100,000,000 invested in hydraulic mining previous to the restriction by the courts.

For detailed information concerning hydraulic mining in the State of California in the early years, the damage caused by it to streams and adjacent lands, and the various plans and projects submitted for enabling hydraulic mining to be resumed, and at the same time protect the other interests involved, attention is invited to the House documents referred to at page 3694 of the Annual Report of the Chief of Engineers for 1904.

By act of Congress approved March 1, 1893, the California Débris Commission was created. The duties of the Commission as prescribed in that act may be placed under two general headings, viz:

(1) To regulate hydraulic mining in the territory drained by the Sacramento and San Joaquin River systems in the State of California, by requiring the operators of hydraulic mines to impound and restrain débris resulting from their operations so that such débris would be prevented from being carried into the river systems above mentioned.

(2) To mature and adopt plans to improve the rivers comprising said systems, deepen their channels, and protect their banks, with the view of restoring to the conditions existing in 1860 the navigability of said rivers as far as practicable, and as far as the necessities of commerce and navigation demand.

Under the first provision the Commission has, up to July 1, 1905, received 699 applications for permits to operate hydraulic mines, and has issued 532 such permits, after being assured by personal inspection, as required by law, that suitable dams or other means had been provided or already existed for properly impounding and storing débris resulting from the operations. Of the 532 permits issued 397 have been since revoked for various causes, principally because the mines have been worked out or abandoned.

Under the second provision of the act it was deemed advisable to first stop the flow of débris into the navigable streams from their tributaries, and a general project was prepared (printed in Annual Report of the Chief of Engineers for 1900, Part 8, p. 5030) for the treatment of Yuba River, this stream being more filled with débris and probably still carrying more detritus than all the other tributaries of the Sacramento River combined. This general project for the treatment of the Yuba River was adopted by act of Congress approved June 13, 1902. The estimated total cost of this project was placed at \$800,000, all of which has been appropriated, \$400,000 by Congress and \$400,000 by the legislature of California, the appropriations by Congress having been made with the provision that one-half the cost of the work should be paid by the State of California. Briefly stated, the Yuba River project provides for holding and storing the enormous quantities of mining débris now in that stream and its tributaries by means of works between Smartsville and Marysville, designed to separate the coarse material from the fine, holding and storing both kinds as they are brought down the river from above, and also to confine the low-water channel in the lower reaches within narrower limits in order to hold in place the extensive deposits already there. These results are sought to be accomplished by means of restraining barriers in the bed of the

river and by a settling basin adjoining the river on the south, the structures to be provided with necessary weirs and conduits to regulate the flow of water. The barriers in the upper part are designed to hold the coarser material and the settling basin to cause the finer material carried in suspension to be deposited.

The operations of the Commission during the fiscal year follow, under the two headings given above.

#### REGULATION OF HYDRAULIC MINING.

During the fiscal year the Commission received 43 applications for permits to mine by the hydraulic process under the requirements of the act of Congress approved March 1, 1893. During the same period permits to operate by the hydraulic process were granted as follows, inspections made by the Commission having demonstrated that suitable dams or barriers to properly impound débris from the mines named had been constructed or were already in existence:

Name of mine.	Name and address of applicant.	Date of permit.
La Mina del Diablo .....	Middle Yuba Mining Co. (Inc.), Sierra City, Sierra County, Cal.	Aug. 8, 1904
Liberty Hill .....	W. I. Wadleigh, Seattle, Wash.....	Dec. 19, 1904
Vacinda .....	Vacinda Mining Co., Vacaville, Cal .....	Sept. 26, 1904
Telegraph .....	Geo. E. Waggoner, David Upton, Indian Diggins, Eldorado County, Cal.	July 5, 1904
Dunderhead.....	Amador and Sacramento Irrigation and Mining Co., Michigan Bar, Sacramento County, Cal.	Do.
York Ranch Placer.....	W. E. Duncan, sr., Oroville, Butte County, Cal.....	Oct. 20, 1904
Treasure Point .....	E. V. Tiffany, Seth Jenkerson, Plymouth, Amador County, Cal.	July 5, 1904
Eagle Bar Placer .....	Eagle Bar Placer Mining Co. (Ltd.), San Francisco, Cal..	Dec. 12, 1904
Sugar Pine .....	W. J. Berry, Theo. Rupley, Smith Flat, Eldorado County, Cal.	Do.
Omega Placer .....	Omega Placer Mining Co., Maybert, Nevada County, Cal.	Dec. 19, 1904
Slide .....	J. F. Cowdery, San Francisco, Cal.....	Dec. 6, 1904
Messer.....	E. J. Gordon, P. McElroy, Spanish Ranch, Plumas County, Cal.	Feb. 27, 1905
Dry Gulch Gravel .....	N. H. Burger, Placerville, Eldorado County, Cal.....	Dec. 12, 1904
Red Rock .....	J. McGrath, Howland Flat, Sierra County, Cal.....	Mar. 29, 1905
Santirfo .....	E. Santirfo, Volcano, Amador County, Cal .....	Dec. 22, 1904
Manila .....	O. Engle, Igo, Shasta County, Cal .....	Dec. 16, 1904
Murderer's Gulch .....	Shasta County Quartz and Placer Mining Co., Corning, Shasta County, Cal.	Feb. 6, 1905
Celtic and Monterey.....	B. G. Smith, S. H. Robinson, Columbia, Tuolumne County, Cal.	Jan. 30, 1905
Council Hill.....	J. F. Schindler, Scales, Sierra County, Cal.....	Do.
Stewart.....	J. B. Stewart, Oleta, Amador County, Cal .....	Jan. 23, 1905
Independence Hydraulic....	G. W. and W. Carpenter, Vic Henderson, Iowa Hill, Placer County, Cal.	Do.
Gold Nugget Placer .....	Victor F., Frank J., and Jos. Dondero, Columbia, Tuolumne County, Cal.	Do.
Lancell Placer.....	North Star Mining Co., New York, N. Y.....	Mar. 20, 1905
Spring Hill .....	Harry Johns, C. F. Cowan, Sonora, Tuolumne County, Cal.	Mar. 7, 1905
Union .....	Alvin W. and Geo. L. Bancroft and Orrin Sawyer, Gibsonville, Sierra County, Cal.	Mar. 13, 1905
Morning Star Placer.....	R. H. and A. M. Andree, Oak, Shasta County, Cal.....	Apr. 10, 1905
Emigrant Hill Placer.....	S. G. Simpson, Quincy, Plumas County, Cal.....	May 1, 1905
Esperance .....	Esperance Drift Mining Co., Nevada City, Nevada County, Cal.	June 14, 1905

The following permits were revoked during the fiscal year, principally for the reason that the mines had been worked out or abandoned, although in several cases the permits were revoked because the holders of them failed to comply with the requirements of the law:

Name of mine.	Name and address of operator.	Date permit was revoked.
Conduit Ravine .....	W. W. and W. A. Lemon, Brownsville, Yuba County, Cal.	Nov. 28, 1904
Mugginsville .....	W. A. Morse, Downieville, Sierra County, Cal.	Dec. 6, 1904
Mitchell .....	Frank J. Goyan, Placerville, Eldorado County, Cal.	Feb. 27, 1905
Kate Gray .....	Giovanni Rossi, Volcano, Amador County, Cal.	Mar. 20, 1905
Sailor Boy .....	Michael Cortez, Camptonville, Yuba County, Cal.	Dec. 6, 1904
Roomie .....	Luigi Lagomarsino, Sierra City, Sierra County, Cal.	Aug. 8, 1904
Ram Creek Placer .....	J. N. McClung, Brush Creek, Butte County, Cal.	Feb. 13, 1905
Dark Ravine .....	Mrs. Henry Hafner, Crescent Mills, Plumas County, Cal.	May 1, 1905
Grasshopper Hydraulic .....	B. Guidici, Pleasant Valley, Eldorado County, Cal.	Jan. 16, 1905
Barnhardt .....	Cadematori & Pierano, San Andreas, Calaveras County, Cal.	Nov. 21, 1904
Hilda .....	Richard Phelan, San Francisco, Cal.	Nov. 28, 1904
Larsen Placer .....	Emil E. Larsen, Placerville, Eldorado County, Cal.	Mar. 6, 1904
Lady Edner .....	Chas. Edner, Omo, Eldorado County, Cal.	Dec. 19, 1904
Gilbert .....	Hoffman & McDonald, Forest Hill, Placer County, Cal.	Jan. 16, 1905
Messerer .....	James Rooks, Spanish Ranch, Plumas County, Cal.	Mar. 15, 1905
Washington .....	Mrs. E. A. Cox, Table Rock, Sierra County, Cal.	Sept. 26, 1904
Jamison Placer .....	John M. Jackson, Johnsville, Plumas County, Cal.	Nov. 14, 1904
Canada .....	O. F. Caya and W. T. Sherman, Portwine, Sierra County, Cal.	May 22, 1905
Ralph Farnham .....	Ralph Farnham, Indian Diggins, Eldorado County, Cal.	Feb. 27, 1905
Badger Hill .....	Geo. Rieber, Fyffe, Eldorado County, Cal.	Mar. 6, 1905
Frazzer & Swank .....	B. Freccero, Washington Ranch, Calaveras County, Cal.	Mar. 27, 1905
Bicknell .....	J. F. Goodman, Volcano, Amador County, Cal.	Mar. 20, 1905
Murphy Diggings .....	O. M. Henry, Volcano, Amador County, Cal.	Do.
Cox .....	Frank J. Goyan, Placerville, Eldorado County, Cal.	Sept. 12, 1904
Bull Run Placer .....	Grant Penrose and Wm. Harker, Relief Hill, Nevada County, Cal.	Jan. 9, 1905
Gravel Hill .....	S. F. Bullard and A. M. Gray, Nevada City, Nevada County, Cal.	Dec. 16, 1904
Meyers Placer .....	G. D. H. Meyers, Placerville, Eldorado County, Cal.	Mar. 6, 1905
Emery Placer .....	Lewis Emery, jr., Bradford, Pa.	Mar. 27, 1905
Badger Hill .....	Badger Hill and Cherokee Gravel Mining Co., San Francisco, Cal.	Feb. 27, 1905
Ohio Placer .....	T. B. Bennett, Wash, Plumas County, Cal.	Nov. 15, 1904
Klondike .....	Geo. W. Cox, Table Rock, Sierra County, Cal.	Sept. 26, 1904
Birdseye Creek Placer .....	J. S. Goodwin, You Bet, Nevada County, Cal.	Jan. 9, 1905
Klondike .....	Alfred Schofield, Gibsonville, Sierra County, Cal.	July 26, 1904
Smiths Blue Gravel .....	John O. Smith, J. Devenport, and Don Noble, Ono, Shasta County, Cal.	Nov. 5, 1904
Pebble Hill .....	G. W. Coates and E. S. Randall, Smiths Flat, Eldorado County, Cal.	Mar. 6, 1905
Inskip Placer .....	E. A. Moody, Gold Run, Placer County, Cal.	Jan. 9, 1905
Manila .....	W. E. Peterson, Igo, Shasta County, Cal.	Dec. 16, 1904
Dewey Consolidated Gravel .....	Dewey Consolidated Gravel Mining Co., San Francisco, Cal.	Jan. 16, 1905
San Francisco .....	H. Sleighter and Thos. Harper, Todd Valley, Placer County, Cal.	Jan. 23, 1905
Undine and May Day Placer .....	E. L. Case et al., Downieville, Sierra County, Cal.	Dec. 6, 1904
Reichel Claim .....	Eagle Gold Mining Co., Stockton, San Joaquin County, Cal.	Mar. 27, 1905
Chaparral Hill .....	F. C. Le Blond and W. E. Olmsted, Stockton, San Joaquin County, Cal.	Dec. 6, 1904
Cadmus .....	J. S. Carter and Wm. Deal, Crescent Mills, Plumas County, Cal.	May 1, 1905
Taylor Diggings Placer Claim .....	W. J. Cox and F. A. Keesy, Taylorville, Plumas County, Cal.	Do.
Victor Placer .....	S. I. Simmons et al., San Francisco, Cal.	Dec. 6, 1904
Norwegian Mining Company's Mine .....	Norwegian Mining Co., San Francisco, Cal.	Mar. 31, 1905
American House .....	N. Gilman, American House, Plumas County, Cal.	Mar. 21, 1905
Old Gardiner's Point Diggings .....	J. A. Modglin, Portwine, Sierra County, Cal.	May 22, 1905
Roanoke .....	D. Hartley & Co., Placerville, Eldorado County, Cal.	Mar. 6, 1905
Independence .....	Manuel Fernandez, Forbestown, Butte County, Cal.	Nov. 28, 1904
Edwards Placer .....	W. J. Edwards, U. S. Webb, and F. W. Hogan, Quincy, Plumas County, Cal.	May 1, 1905
Robert Burns Gravel .....	James Broad, Placerville, Eldorado County, Cal.	Mar. 6, 1905
Caledonia .....	McBride Bros., St. Louis, Sierra County, Cal.	May 22, 1905
James Watson Placer .....	Jno. C. Voluntine, Henry Chapman, Redding, Shasta County, Cal.	Sept. 22, 1904
Browns Flat .....	J. F. Cowdery, San Francisco, Cal.	Sept. 13, 1904
Mamaluke Hill .....	Sidney G. Sturman, Georgetown, Eldorado County, Cal.	Jan. 12, 1905
Crystal Springs Gravel .....	Peter Simonson, Oak, Shasta County, Cal.	Feb. 6, 1905
Roosevelt Placer .....	O. P. Demuth, H. P. Farnsworth, Kelsey, Eldorado County, Cal.	Feb. 20, 1905

Name of mine.	Name and address of operator.	Date permit was revoked.
Leveroni Placer .....	Nicola Dondero, Newtown, Eldorado County, Cal.....	Oct. 31, 1904
St. George .....	G. and L. Pease, Yankee Jims, Placer County, Cal.....	Jan. 16, 1905
Aurelia Gravel .....	The Calaveras Development Co., Glencoe, Calaveras County, Cal.	Mar. 20, 1905
Old Stiff Gravel.....	W. S. Kerr, Vallecita, Calaveras County, Cal.....	Mar. 27, 1905
Excelsior.....	Excelsior Hydraulic Mining Co., San Francisco, Cal.....	Jan. 9, 1905
Phillips .....	E. C. Kavanaugh, Wm. H. Duffey, Forest Hill, Placer County, Cal.	Feb. 20, 1905
Slug Gulch .....	E. C. Robinson, Oakland, Cal.....	Feb. 27, 1905
Railroad Hill Gravel.....	L. and V. Demartini, San Andreas, Calaveras County, Cal.	Nov. 8, 1904
Emigrant Hill Placer Claim.	F. M. Conn and S. G. Simpson, Quincy, Plumas County, Cal.	May 1, 1905
Treasure Point .....	E. V. Tiffany, S. Jenkerson, Plymouth, Amador County, Cal.	Sept. 12, 1904
Omega Placer .....	Omega Placer Mining Co., Maybert, Nevada County, Cal.	Mar. 20, 1905

During the past year 39 licenses were temporarily suspended for various causes, and 700 personal inspections of mines were made.

Several partial failures of dams built or maintained by operators of hydraulic mines to impound and restrain débris of mines under the jurisdiction of the Commission occurred during the year, mainly from the heavy freshets of the winter and spring. In these cases the operators of the mines were immediately required to suspend mining pending the completion of necessary repairs to the dams.

A number of reports were received during the year to the effect that hydraulic mining was being carried on at various places without the licenses of the Commission required by the act of Congress of March 1, 1893.

Three of these cases were in Nevada County and one in Plumas County. Proceedings were instituted at the request of the Commission by the United States district attorney in these cases, which resulted in the arrest of all the persons implicated.

Of eight persons already examined, six of those implicated in the three cases in Nevada County were bound over for trial under \$500 bonds by the United States commissioner before whom the preliminary hearings in those cases were held. The preliminary hearing of the case in Plumas County is set for July 25, 1905.

These are the first criminal proceedings that the Commission has found necessary to institute. It is believed that they will have a decided effect in deterring others from engaging in illegal mining operations.

The total quantity of material mined under permits during the year ending May 31, 1905, as shown by the reports submitted monthly to the Commission by the operators of the mines, was, approximately, 705,000 cubic yards.

As in previous years, it has been reported that injunctions were issued by county courts during the past year enjoining the operators of several mines holding permits from the Commission from operating by the hydraulic process. This matter was commented on in detail in the last Annual Report of the Chief of Engineers (pp. 3696-3698), to which attention is invited.

During the past year a careful survey was made of the Yuba River from the site of the barriers to the mouth for the purpose of relocating the work at various places along the river as at present planned and to accurately ascertain the capacity and limits of the settling basin



transferred to the United States during 1903. Cross sections of the river bed were also made to show what changes had taken place. The results of this survey were not completely platted at the close of the year.

The \$15,000 given in the following money statement as the amount that can be profitably expended in fiscal year ending June 30, 1907, is the amount which it is estimated will be required to meet the expenses of the California Débris Commission during that fiscal year in properly regulating hydraulic mining operations in the State of California, as required by the act of Congress approved March 1, 1893:

*Money statement.*

FOR APPROPRIATION OF APRIL 28, 1904, FOR "EXPENSES OF CALIFORNIA DÉBRIS COMMISSION, 1905."

July 1, 1904, balance unexpended .....	\$15,000.00
June 30, 1905, amount expended during fiscal year .....	14,662.73
<hr/>	
July 1, 1905, balance unexpended .....	337.27
July 1, 1905, outstanding liabilities .....	85.46
Balance (reverts to Treasury) .....	251.81
March 3, 1905, amount appropriated for "Expenses of California Débris Commission, 1906" .....	15,000.00
Amount (estimated) required for "Expenses of California Débris Commission" during fiscal year ending June 30, 1907 .....	15,000.00
July 1, 1905, amount expended during fiscal year from appropriation for "Expenses of California Débris Commission, 1904" .....	886.26

IMPROVEMENT AND PROTECTION OF RIVERS.

Under the project for improvement and protection of rivers, operations during the past fiscal year were in connection with the treatment of Yuba River, under the general plans printed in the Annual Report of the Chief of Engineers for 1900 (Part 8, pp. 5030-5064). These operations consisted principally of acquiring easements to additional lands required, completing the first step and apron of barrier No. 1, commencing work of constructing the second step of barrier No. 1, continuing the work of excavating the cut through Daguerre Point, Yuba River, and commencing the work of constructing earth embankments immediately below Daguerre Point to confine the river to a fixed channel. The location of barrier No. 1 and Daguerre Point is shown on sheet A, which accompanied House Document No. 431, Fifty-sixth Congress, first session.

The operations during the past fiscal year, in detail, were as follows:

*First step and apron of barrier No. 1, Yuba River.*—The first step and the apron of this barrier were completed during the past fiscal year in accordance with the plans opposite page 3709 of the last annual report and as further described at pages 3702 and 3703 of the same report, to which attention is invited for details. The four parallel rows of piles extending across the river to anchor the first step and apron to the bed of the river were driven by hired labor. No special difficulty was experienced in driving them 35 to 40 feet penetration. Altogether 888 piles were driven in this construction.



The piles purchased for this work averaged 37 feet in length, 13 inches in diameter at the large end, and 8 inches in diameter at the small end. Most of them came by rail from southern Oregon to Marysville, Cal., and were hauled from Marysville to barrier No. 1, a distance of 17 miles, by team. The average price paid for piles on board cars at Marysville was 20.7 cents per linear foot, the cost of hauling from Marysville to barrier No. 1 was 6.8 cents per linear foot, making the total cost for the piles delivered at the site of the barrier 27.5 cents per linear foot. The cost of driving the piles was \$5.02 each, making the average cost for the piles furnished, delivered, and driven about \$17 each. The piles were driven with a 3,200-pound pile-driver hammer operated with a 20-horsepower hoisting engine and a pile-driver derrick 45 feet high. The following data concerning the driving of these piles is from the record kept by the assistant in immediate charge of the work:

Total number of piles driven (including 25 piles driven between abutment and north shore) .....	888
Total combined penetration of all piles driven.....linear feet..	27,416
Average penetration per pile (not including piles driven between abutment and shore) .....	31½
Average number of blows of pile-driver hammer required per foot of penetration .....	5
Maximum number of piles driven in one day.....	15
Average number of piles driven per day.....	6

The piles were all driven with a skid driver supported on the tops of the piles. Driving piles was first commenced on February 8, 1904. Extreme high water on February 22, 1904, reached and overturned the driver and carried it 300 yards downstream. Continued high water interfered with the work of recovering and repairing the pile driver and other plant. Driving was resumed March 16, 1904, and 4 piles driven. On the following day the water rose again and carried the driver 200 yards downstream. The driver was moved back to line and 3 piles driven on March 25 and 26, 1904. By using greased piles as a ramp the driver was raised 6 feet from the river bottom to the tops of the piles. Driving was then resumed and continued without further interruption. After June 2, 1904, and until August 1, 1904, two crews were employed, altogether in daylight, the first shift from 4 o'clock a. m. to 12 o'clock noon and the second shift from the latter hour to 8 o'clock p. m. Driving was completed on August 11, 1904.

The use of a jet as an aid to driving round piles as well as plank was tested on May 28, 1904. The material in the river bed consists of sand, gravel, and cobbles, some of the cobbles weighing as much as 50 pounds. A Worthington 10" by 6" by 10" steam pump was used, steam being taken from the boiler of the hoisting engine. This boiler was small for the pump, and it was impossible to maintain a water pressure of more than 90 or 100 pounds. The pump discharged into a short piece of 5-inch pipe reduced to 2½ inches, then into 100 feet of 2½-inch cotton jacketed fire hose, and then into 100 feet of 2-inch pipe drawn down to a 1½-inch nozzle. The lower end of the 2-inch pipe was offset 2 inches to allow the jet to play in front of the point of the pile, the pile being notched. The jet was fastened to the pile by two staples, one at the top and one at the bottom. Four tests were made, two with round piles, one with a 3 by 10 inch by 20-foot plank, and one with the pipe alone. Each test was unsuccessful. The tests of the round piles and plank were made by fastening the pipe to the pile

north parallel to the crest of the barrier along its upstream slope and around the north abutment. The surface of the water where the river first struck the barrier was 18 inches below the crest of the latter; between the north abutment and the shore it was about 6 feet below the crest. Several plans were tried to close this opening and turn the water over the crest of the completed first step of the barrier. The first plan consisted of driving a double row of piles, 10-foot centers and 10 feet between rows, from the abutment to the shore, a distance of about 150 feet. Both rows of piles were bulkheaded and the space between them filled with gravel, excepting for the distance of 40 feet through which opening the river flowed. Across this 40-foot gap the upstream row of piles was planked from the water level up, and an apron of plank to fit the opening below the water surface constructed. It was found to be impossible, however, to drop this apron to the bottom owing to the water pressure. Brush was placed above the piles and weighted. The water level was raised by this about 4 feet, but at that point the piles failed. A dam of sacks filled with gravel was then started across the break, but before it could be completed high water tore it out. Piles were driven between October 17 and November 6. They failed on November 11, and the sack dam was washed out on November 16 and 17.

The second and successful plan for turning the flow of the river over the crest of the first step of the barrier consisted in constructing a levee of gravel and sacks filled with sand 1,530 feet long, the crest of which was about 2 feet higher than the crest of the barrier. This levee was thrown up on a gravel bar, and extended upstream from a point near the middle of the barrier. This levee caused the gravel bar to build up until the bar was of the same level as the crest of the levee. This work was completed on November 23, thus turning all the flow of the river, except the leakage through the sacks, over the south half of the barrier, and leaving the channel between the abutment and the north shore practically dry, when the opening was easily closed. The success of this plan was due to the fact that by building a dam on the line adopted the water level had only to be raised 18 inches to start the water over the dam, or 2 feet to take the entire flow. Piles to replace and reinforce those broken off on November 11 were driven between November 17 and 24. A mattress of brush fascines weighted with sacks filled with sand was then placed between and above the piles, and the upper and lower rows of piles planked. The earth fill was then carried across the opening without further difficulty. The break was closed on November 29.

As soon as the high water period of the fall of 1904 set in the first step of the barrier commenced to perform its functions—that of holding back and impounding the heavier débris brought down by the Yuba River. Soon after the débris impounded by the first step was level with the crest of the latter. The impounded material immediately above this structure now extends upstream for the distance of about 2,000 feet. The width of the area covered by this impounded material is about 1,500 feet. The average depth of the impounded material is 3 feet. It is therefore estimated that about 333,000 cubic yards of débris has been impounded above this work since the first step was completed, in October, 1904.

The last work to be done to complete the first step of barrier No. 1 consisted of constructing an earth embankment extending from the

abutment to the north shore. This embankment was constructed under an emergency contract with Lewis Moreing, dated October 3, 1904. The contract required that the embankment should be about 150 feet long, with a crown 30 feet wide; that below elevation 215 the upstream slope should be built 1 on 2½. The downstream slope was to be 1 on 1½, a berm to be left 10 feet wide at elevation 205. Work under this contract was begun late in November, 1904, and was completed on January 7, 1905. The downstream slope was protected with riprap on brush fascines, and the outer 50 feet of the upstream slope was protected with a layer of brush fascines. The material for the embankment was obtained immediately north of the work, and consisted of cemented gravel and shale. It was shot and loaded in carts with shovels.

The quantities of materials furnished and placed by the contractor in the embankment, and the contract prices therefor, were as follows:

Embankment fill, 12,172 cubic yards, at \$1.....	\$12, 172. 00
Riprap, 445 square yards, at \$1.....	445. 00
	<hr/>
	12, 617. 00
Deduct one-half payable by State of California .....	6, 308. 50
	<hr/>
Balance payable by United States .....	6, 308. 50

*Second step of barrier No. 1, Yuba River.*—During the past winter and spring plans and specifications for the construction of the second step of barrier No. 1 were prepared. These were approved by the Chief of Engineers and concurred in by the California State board of examiners, and proposals were invited for furnishing and hauling the necessary materials and placing them in the work.

On February 7, 1905, a formal contract was entered into with Hugh McGuire, of Marysville, Cal., which provided that the contractor should construct and deliver at the site of barrier No. 1 a pile-driver derrick, a new one being needed to replace the one formerly in use, which had become worn out. This contract also provided that the contractor should furnish, deliver, and store at the site of the barrier about 400 piles, each 40 feet long, for use in constructing the second step of the barrier. The contractor completed all the work required under this contract on May 20, 1905. The piles furnished under this contract were brought by rail from the State of Oregon to Marysville, Cal., and hauled from the latter place to the barrier by teams. The roads were in very unfavorable condition while the piles were being hauled, an 8-horse team being able to haul only from five to six piles at a time. It required two days to make a round trip between Marysville and the barrier. During the time the last 75 piles were being hauled the roads were in better condition, an 8-horse team being able to haul 8 or 9 piles at a time. The materials furnished and delivered at the barrier under this contract and the contract prices for same were as follows:

Pile-driver derrick .....	\$630. 00
Piles, 15,960 linear feet, at 31½ cents .....	5, 027. 40
	<hr/>
	5, 657. 40
Deduct one-half payable by State of California .....	2, 828. 70
	<hr/>
Balance payable by United States .....	2, 828. 70

On March 22, 1905, a formal contract was entered into with Palmer & McBryde for driving the piles for the second step of the barrier, which piles were furnished and delivered, as above stated, by Hugh McGuire under the contract of February 7, 1905. Under this contract with Palmer & McBryde two rows of piles were driven across the river immediately above the first step. These two rows were driven 10 feet apart, the piles in the upstream row being 6 feet apart between centers and those in the downstream row 12 feet apart between centers. The lower of the two new rows was driven a distance of 16 feet upstream from the upstream row of piles in the first step of the barrier completed last season. These two new rows contained 294 piles. Under this contract, also, two rows of piles were driven near the south bank for a cofferdam, to be used in closing the dam when the remainder of the work is completed, the river in the meantime passing through the gap where these piles are located. These two rows contain 41 piles.

All piles were driven with a skid driver, which was moved along on top of the driven piles, the piles being capped every 12 feet with 12 by 12 inch by 18 feet caps, and the caps being moved ahead of the driver as the latter was moved forward. These caps were temporarily fastened to the piles with  $\frac{7}{8}$ -inch by 20-inch drop bolts. The greatest number of piles driven in a day of eight hours under this contract was 8, the average being 4. Work was commenced April 19, 1905, and completed on June 14, 1905.

The work done and the contract prices for same were as follows:

Driving 335 piles, at \$7.60 each.....	\$2, 546. 00
Less rental for plant belonging to United States and State of California...	1, 016. 64
	<hr/>
	1, 529. 36
Deduct one-half payable by State of California .....	764. 68
	<hr/>
Balance payable by the United States.....	764. 68

On March 25, 1905, a formal contract was entered into with the Western Fuel Company for furnishing and delivering on board cars at Marysville, Cal., the necessary cement required in the construction of the second step of barrier No. 1. The contract calls for "Standard" Portland cement, manufactured by the Standard Cement Company at Napa Junction, Cal. About 12,000 sacks (3,000 barrels) of cement are required under this contract. The amount earned by the contractor up to the end of the fiscal year, the contract price, etc., are as follows:

Cement furnished on board cars at Marysville, Cal., 9,336 sacks, at 56 $\frac{1}{2}$ cents.	\$5, 251. 50
Deduct one-half payable by State of California .....	2, 625. 75
	<hr/>
Balance payable by the United States .....	2, 625. 75

On March 29, 1905, a formal contract was entered into with George S. Risher for hauling cement from Marysville to barrier No. 1. This contract provides that the contractor shall unload the cement delivered in Marysville by the Western Fuel Company under their contract and haul it to barrier No. 1, and there store it in a temporary cement shed belonging to the United States and State of California. The cement is being hauled by teams of 6 to 12 horses each, these teams making the round trip in two days. A 6-horse team hauls about 115 sacks of cement and a 12-horse team about 185 sacks. Each sack contains about 94 pounds of cement.

The amount earned by the contractor up to the end of the fiscal year, the contract price, etc., are as follows:

Hauling 9,549 sacks of cement from Marysville, Cal., to barrier No. 1, Yuba River, California, at 18½ cents per sack .....	\$1, 754. 62
Deduct one-half payable by State of California .....	877. 31
Balance payable by the United States .....	877. 31

On May 8, 1905, a formal contract was entered into with Palmer & McBryde for the construction of the second step of barrier No. 1. This contract provides that the second step of the barrier shall be built immediately upstream from the first step and connect with it; the second step to be approximately 1,250 feet long, crest measurement, and its top to be 8 feet higher, measured vertically, than the top of the first step. It is to have a flat crest 10 feet wide, a plane-inclined upstream face, and a sloping and curved downstream face connecting with the first step. The plans for the second step are shown on Appendix A herewith, being indicated thereon by the words "Present contract," to which attention is invited for further details. This contract also provides for raising the concrete abutment at the north end of the first step 10 feet higher, and also for lengthening it. It also provides for raising 10 feet higher the earth embankment connecting the north end of the first step with the river bank. With the exception of furnishing and driving the piles and, furnishing the necessary cement, which were subject of other contracts, as before referred to, the contract with Palmer & McBryde of May 8, 1905, requires the contractors to furnish all materials, plant, and labor necessary to construct the second step of the barrier.

Palmer & McBryde commenced operations on May 11, 1905, and the quantities of materials placed by them in the work between that date and June 30, 1905, and the contract prices for same, are as follows:

Material excavated, 250 cubic yards, at 75 cents .....	\$187. 50
Embankment placed, 4,800 cubic yards, at 30 cents .....	1, 440. 00
Bulkhead lumber, 3,500 feet B. M., at \$25 per 1,000 feet .....	875. 00
Rock fill, 462.68 tons, at 87½ cents .....	404. 84
	2, 907. 34
Deduct one-half payable by State of California .....	1, 453. 67
Balance payable by the United States .....	1, 453. 67

*Daguerre Point, Yuba River.* The work of excavating the cut through Daguerre Point was continued during the past fiscal year under formal contract with Edward Mulloy of October 13, 1903. The object of the cut, its dimensions, and other data concerning it were given in the Annual Report of the Chief of Engineers for 1904, pages 3705-3706, to which attention is invited for details. From July 1, 1904, to October 7, 1904, and from April 17, 1905, to June 30, 1905, two shifts of men were employed by the contractor in excavating this cut; during the remainder of the fiscal year one shift was employed. The principal article of plant used by the contractor on this work during the past year consisted of a 2½-yard Bucyrus steam shovel. This steam shovel loaded the excavated material into 4-yard side-dump cars. Ten cars constitute a train. The trains were drawn by small locomotives, being assisted out of the pit to the waste dump (a 20-foot rise) by a hoisting engine. The contractor had on the work three



locomotives, twenty-six 4-yard side-dump cars, and one 30-horse-power hoisting engine. Only two of the locomotives were used, however, the third one having been found unsuitable for the work. Rock having been encountered by the contractor during the past year at places not expected, the rock formation was tested by the United States by drilling holes down to rock. As the presence of much more rock was disclosed by these test holes than was expected, the lines of the cut were changed somewhat to avoid this rock cutting. The estimated total quantities of excavation on the new lines will be about 636,000 cubic yards of earth and 4,600 cubic yards of rock. Of these quantities 553,000 cubic yards of earth and 1,300 cubic yards of rock have been excavated to June 30, 1905.

The quantities of material excavated under this contract during the past fiscal year, the contract prices, etc., are as follows:

Earth excavated, 356,000 cubic yards, at 23½ cents.....	\$83,660
Rock excavated, 1,300 cubic yards, at 90 cents.....	1,170

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84,830

Deduct one-half payable by State of California .....	42,415
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Balance payable by the United States .....	42,415
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Reference was made in the last annual report of the Chief of Engineers (p. 3706) to the fact that W. P. Hammon and associates had on September 5, 1903, executed a deed to the United States, one of the provisions of which requires Mr. Hammon and his associates to build, free of cost to the United States, a portion of a proposed embankment near Daguerre Point. This embankment is to be built across the Yuba River, along the head of Pine Island, and just above Daguerre Point. A later proposal was accepted from Mr. Hammon to build a wall just below Daguerre Point along the south side of the main channel. The embankments to be built by Mr. Hammon and associates are to be in all about 20,500 feet long, 300 feet wide on the base, and 30 feet in height at the highest places. It is estimated that the completed embankment will contain upward of 2,000,000 cubic yards of material.

It is to be thrown up by means of gold dredges, incidental to the work of dredging for gold in Yuba River. The work of constructing the embankment was commenced in September, 1904. During the year two dredges have been at work and have constructed 2,100 feet of embankment. Six more dredges are now being built, all of which will assist in building the embankments.

During the past fiscal year an agreement was also reached with Mr. John Martin, of San Francisco, Cal., which provided that Mr. Martin should construct a similar embankment below the old State dam, a short distance downstream from Daguerre Point, Yuba River, along the south side of the channel and connecting with that of Mr. Hammon. Later on Mr. Martin's interests in this matter were acquired by the Marysville Gold Dredging Company. The embankment to be built under this arrangement is to be constructed of same dimensions and in similar manner to that followed by Mr. Hammon. Its length will be about 8,200 feet and it will contain upward of 800,000 cubic yards of material. None of the embankment has as yet been built, but two dredges are now being built near the site of the proposed work.

On October 18, 1904, an emergency contract was entered into with Lewis Moreing which provided that the contractor should close channels at a place known as Kupser's Slough, about 1 mile below Daguerre Point. This work consisted in constructing two embankments of sand about 1,500 feet in length in all by means of Fresno scrapers, and in placing brush on a portion of the embankments to protect them against scour. The contractor commenced work under this contract on October 18, 1904, and completed it on November 4, 1904.

The quantities of materials furnished and placed under this contract, and the contract prices therefor, were as follows:

Fill in place, 11,660 cubic yards, at 35 cents .....	\$4,081.00
Brush protection in place, 245 square yards, at 35 cents .....	85.75
	<hr/>
	4,166.75
Deduct one-half payable by State of California .....	2,083.38
	<hr/>
Balance payable by United States .....	2,083.38

To further protect these embankments willows and cottonwood were planted by hired labor at an additional expense of \$12.50.

Those portions of the embankments not protected with brush under the contract with Lewis Moreing of October 18, 1904, were brushed by the Marysville Levee Commissioners at cost, viz, 10 cents per square yard. In this way 4,733.2 square yards of brush protection was placed in the embankments at a total cost of \$473.32.

About 100 feet of the embankment was washed out about January 1, 1905, during high water. It has not been replaced, however, as the embankment has already effectively turned the river channel to the southward, which was the object sought to be accomplished.

Under date of March 29, 1905, a formal contract was entered into with Mr. Anson B. Munson, providing for the construction of an embankment extending downstream along the north bank of the Yuba River from Daguerre Point. This embankment is to be built for the purpose of assisting in confining and directing the river at high stages in the channel selected in conformity with the project. This embankment is to be about 12,000 feet long. Its top will be generally 13 feet above the average level of the river bed in the vicinity for the first 1,000 feet from its upstream end and 11 feet above the corresponding level for the remainder of the distance, the 2 feet difference to be lost uniformly in the second thousand feet of length. The crown of the embankment will be about 10 feet wide. On the river side the slope will be about 1 vertical on 3 horizontal, and on the land side it will be 1 vertical on 2 horizontal.

It is estimated that the completed embankment will contain about 200,000 cubic yards of material. It is to be built of the material of the river bed in the vicinity. The contract price for the embankment in place is 12.4 cents per cubic yard. Up to the end of the fiscal year the contractor's operations had consisted of clearing the brush from about 5,300 feet of the line of the proposed embankment.



# 2600 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

## *Money statement.*

July 1, 1904, balance unexpended .....	\$353,462.84
June 30, 1905, amount expended during fiscal year, for works of improvement .....	89,361.68
July 1, 1905, balance unexpended .....	264,101.16
July 1, 1905, outstanding liabilities payable by United States .....	14,674.97
July 1, 1905, balance available .....	249,426.19
July 1, 1905, amount of United States funds covered by uncompleted contracts .....	44,172.69

## APPROPRIATIONS BY CONGRESS.

June 3, 1896 .....	\$250,000
June 13, 1902 .....	150,000
Total appropriated by Congress .....	400,000

## CONTRACTS IN FORCE.

*Abstract of formal contract in force during fiscal year ending June 30, 1905, for building portions of barrier No. 1, Yuba River, California.*

Name of contractor, Lewis Moreing; contract approved May 17, 1904; work to be begun on or before June 17, 1904, and to be completed on or before November 17, 1904. The contract provided that the contractor should excavate 3,500 yards of gravel, at 30 cents per cubic yard; furnish and deliver 9,000 feet of piles, at 20 cents per linear foot; drive in position, straighten, and cut off 500 piles, at \$1.50 per pile; furnish, deliver, and place 67,000 feet of lumber, at \$40 per 1,000 feet B. M.; 120 cords of loose brush, at \$3.50 per cord; 2,844 yards of mattress, at 50 cents per square yard; 1,500 tons of large rock, at \$2 per ton; 1,000 yards of large rock laid in Portland cement mortar, at \$7 per cubic yard; 4,800 tons of small rock, including sluicing, at \$1 per ton; 17,000 feet of cable, at 18 cents per linear foot; 2,800 yards of concrete, at \$7.50 per cubic yard; 300 pile points, at 50 cents each.

*Abstract of emergency contract in force during fiscal year ending June 30, 1905, for constructing embankment fill at barrier No. 1, Yuba River, California.*

Name of contractor, Lewis Moreing; work to be begun on or before December 19, 1904, and to be completed within thirty days from date of commencement. The contract provided that the contractor should construct 8,000 yards of embankment fill, at \$1 per cubic yard, and furnish and place 300 yards of riprap, at \$1 per square yard.

*Abstract of formal contract in force during fiscal year ending June 30, 1905, for erecting pile-driver derrick and for furnishing and delivering piles for use in constructing portion of barrier No. 1, Yuba River, California.*

Name of contractor, Hugh McGuire; contract approved February 15, 1905; work to be begun on or before March 17, 1905, and to be completed before May 1, 1905. The contract provided that the contractor should construct and deliver 1 pile-driver derrick for \$630, and furnish, deliver, and store at barrier No. 1, Yuba River, California, 400 piles (each about 40 feet long), at 31½ cents per linear foot.

*Abstract of formal contract in force during fiscal year ending June 30, 1905, for driving piles, etc., for portion of barrier No. 1, Yuba River, California.*

Name of contractors, Palmer & McBryde; contract approved April 1, 1905; work to be begun on or before April 1, 1905, and to be completed by June 15, 1905. The contract provided that the contractors should drive 350 piles, at \$7.60 per pile, and furnish and place 5,000 pounds of cast-iron pile shoes, at 6 cents per pound.

*Abstract of formal contract in force during fiscal year ending June 30, 1905, for furnishing cement for use in building a portion of barrier No. 1, Yuba River, California.*

Name of contractor, Western Fuel Company; contract approved April 3, 1905; work to be begun before May 1, 1905, and to be completed before July 1, 1905. The contract provided that the contractor should furnish and deliver at Marysville, Cal., 12,000 sacks of "Standard" (American) Portland cement, at 56½ cents per sack (each sack containing about 93 pounds of cement), and that a rebate of 5 cents each should be allowed for empty sacks returned in good condition, free on board cars at Marysville, Cal.

*Abstract of formal contract in force during fiscal year ending June 30, 1905, for hauling cement for use in building a portion of barrier No. 1, Yuba River, California.*

Name of contractor, George S. Risher; contract approved April 5, 1905; work to be begun before May 1, 1905, and to be completed before July 1, 1905. The contract provided that the contractor should unload 12,000 sacks of cement from cars at Marysville, Cal., haul and deliver same at the site of barrier No. 1, Yuba River, California (a distance of about 17 miles), and there store it in cement storehouse belonging to the United States and State of California, at 18½ cents per sack (weight about 94 pounds each).

*Abstract of formal contract in force during fiscal year ending June 30, 1905, for building portions of barrier No. 1, Yuba River, California.*

Name of contractors, Palmer & McBryde; contract approved May 17, 1905; work to be begun by June 15, 1905, and to be completed by October 31, 1905. The contract provides that the contractors shall excavate 3,000 yards of material, at 75 cents per cubic yard, and furnish, deliver, and place the following-named materials at the prices stated: 12,000 yards of embankment, at 30 cents per cubic yard; 59,000 feet of bulkhead lumber, at \$25 per 1,000 feet board measure; 10,000 tons of rock fill, at 87½ cents per ton of 2,000 pounds; 2,200 tons of large rock, at \$2 per ton of 2,000 pounds; 3,300 yards of concrete (cement for this concrete to be furnished the contractors by the United States and State of California), at \$4.25 per cubic yard; 17,000 feet of cable, at 15 cents per linear foot; 800 yards of brush fascine mattress, at 70 cents per square yard; 5,000 sand bags, filled with sand, at 7 cents each.

*Abstract of formal contract in force during fiscal year ending June 30, 1905, for excavating cut at Daguerre Point, Yuba River, California.*

Name of contractor, Edward Malley; contract approved October 26, 1903; work to be begun on or before December 26, 1903, and to be completed on or before November 16, 1905. The contract provides that the contractor shall excavate 667,000 cubic yards of earth, at 23½ cents per cubic yard, and 2,000 cubic yards of rock, at 90 cents per cubic yard.

*Abstract of emergency contract in force during fiscal year ending June 30, 1905, for closing sloughs of Yuba River, California.*

Name of contractor, Lewis Moreing; work to be begun on or before October 25, 1904, and to be completed within 20 days from date of commencement. The contract provided that the contractor should furnish and place 11,000 yards of sand and gravel fill, at 35 cents per cubic yard, and 400 yards of brush protection, at 35 cents per square yard.

*Abstract of formal contract in force during fiscal year ending June 30, 1905, for constructing embankment near Daguerre Point, Yuba River, California.*

Name of contractor, Anson B. Munson; contract approved April 12, 1905; work to be begun on or before June 16, 1905, and to be completed on or before June 18, 1906. The contract provides that the contractor shall construct 200,000 yards of embankment fill, at 12¼ cents per cubic yard.

2602    REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

*Abstract of emergency contract in force during fiscal year ending June 30, 1905, for office rooms in San Francisco, Cal., for the use of the California Débris Commission.*

Name of contractor, B. P. Oliver; contract to become effective April 1, 1905, to terminate on or before June 30, 1906. The contract provides that the contractor shall rent rooms to the United States in the Flood Building, San Francisco, Cal., used as office rooms by the California Débris Commission, at \$70 per month; rental to include heat, light, water, and elevator service.

Respectfully submitted.

W. H. HEUER,  
*Colonel, Corps of Engineers*  
THOS. H. HANDBURY,  
*Colonel, Corps of Engineers*  
WM. W. HARTS,  
*Captain, Corps of Engineers*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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# 1. HYDRAULIC GOLD MINING IN CALIFORNIA.

Up to June 30, 1903 the California Debris Commission received 699 applications for permits to mine by the hydraulic process, under the requirements of the Act of Congress approved March 3, 1893.





7. BARRIER NO 1, YUBA RIVER, CALIFORNIA LOOKING NORTH, OCTOBER, 1904. FIRST STEP AND APPROX. SURFACE --



## **APPENDIX B B B.**

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### **BRIDGES AT WASHINGTON, DISTRICT OF COLUMBIA.**

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**REPORT OF LIEUT. COL. SMITH S. LEACH, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905.**

- |  |   |
|--|---|
| 1. Repair of the Aqueduct Bridge across Potomac River at Washington, District of Columbia. | 2. Highway bridge across the Potomac River at Washington, District of Columbia. |
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UNITED STATES ENGINEER OFFICE,  
*Washington, D. C., July 10, 1905.*

GENERAL: I have the honor to forward herewith my annual report for the fiscal year ending June 30, 1905, for bridges at Washington, D. C., in charge of Col. A. M. Miller, Corps of Engineers, until September 13, 1904; of Capt. W. P. Wooten, Corps of Engineers, from September 14, 1904, until November 14, 1904, and in my charge since the latter date.

Very respectfully,

SMITH S. LEACH,  
*Lieut. Col., Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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### **B B B 1.**

#### **REPAIR OF THE AQUEDUCT BRIDGE ACROSS THE POTOMAC RIVER AT WASHINGTON, DISTRICT OF COLUMBIA.**

**WORK OF THE FISCAL YEAR ENDED JUNE 30, 1905.**

##### **(A) RECONSTRUCTION OF PIER NO. 5.**

At the beginning of the fiscal year work under this contract had progressed as far as the preparation of most of the cut stone for the new pier, the construction of the cofferdam and false work, the pumping out of the dam, and the raising of the bridge spans from the old pier and their suspension from the A frames of the false work. Some trouble with heavy leaks was experienced during the pumping out of the dam, and one serious blow-in of water through a break in the sheeting delayed work for some weeks.

This being satisfactorily repaired and the dam pumped dry, the demolition of the old pier was commenced early in July, 1904, and completed in the latter part of August, the laying of masonry being commenced immediately thereafter.

The limited derrick room under the A trusses, and the large number of interior braces in the working inclosure of the dam, made the laying up of masonry a rather slow operation, and considerably more time was required than would have been necessary under more favorable working conditions. Fair progress was made, under the circumstances, and on October 22 the last stone was set.

No trouble was experienced with water leakage after the repair of the first blow-in, the dam thereafter being remarkably tight. All during masonry laying the inflow was easily handled by a 6-inch vacuum pump working intermittently.

After setting the truss shoes and lowering the bridge spans into permanent position on the pier the tearing apart of the false work and cofferdam was immediately commenced, and by the early part of December all construction timber had been removed from the work, the area surrounding the pier dredged to its original depth, all necessary repairs to the trusses made, and the entire work completed.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$61,511.09
June 30, 1905, amount expended during fiscal year, for works of improvement .....	59,899.00
	<hr/>
July 1, 1905, balance unexpended, deposited in Treasury .....	1,612.09

#### CONTRACT IN FORCE.

Contractors: Penn Bridge Company, Beaver Falls, Pa., for reconstructing pier No. 5.

Date: April 22, 1903.

Approved: May 18, 1903.

Date for commencement: May 1, 1903.

Date for completion: December 1, 1903; time limit for completion of contract waived; final payment made to contractors February 4, 1905.

Rate: Construction, maintenance, and removal of cofferdam and false work, \$7,000; pumping out cofferdam, \$3,500; removal of old masonry, 1,270 cubic yards, at \$5 per cubic yard; excavation and removal of débris, 200 cubic yards, at \$10 per cubic yard; removal of rock projecting above grade, actual cost plus 10 per cent; ashlar masonry, 530 cubic yards, at \$40 per cubic yard; base and backing masonry, etc., 940 cubic yards, at \$12 per cubic yard; resetting coping, 21 cubic yards, at \$6 per cubic yard; repairs of trusses, materials, etc., \$3,500; material and labor for fence and walk, actual cost plus 10 per cent. Total, \$54,956.

#### (B) REPAIRS TO REMAINING PIERS.

The under-water portion of all of the old piers of the bridge, the only part under suspicion, having been carefully examined and repaired by diver during the previous fiscal year, it was thought useless and unnecessary to attempt any further operations of this kind this season, there having been no floods or freshets of any consequence in the river since the time of repair, and consequently no reason why any radical changes should have occurred.

It will probably be advisable to conduct a further examination some time during the spring of 1906, and to retain the balance now on hand to cover such examinations and repairs as may appear to be necessary.

*Money statement.*

July 1, 1904, balance unexpended .....	\$2, 317. 77
June 30, 1905, amount expended during fiscal year, for maintenance of improvement .....	104. 40
July 1, 1905, balance unexpended .....	2, 213. 37

B B B 2.

HIGHWAY BRIDGE ACROSS THE POTOMAC RIVER, WASHINGTON,  
DISTRICT OF COLUMBIA.

WORK OF THE FISCAL YEAR ENDED JUNE 30, 1905.

At the beginning of the fiscal year the pile driving of 5 piers and 1 abutment had been completed, the cofferdams of 3 piers were in place, and a small amount of earth had been deposited in the Washington approach embankment.

Delays were experienced throughout the season by reason of tardy arrivals of materials for the substructure, but the work was carried forward steadily until January, 1905, when difficulties presented by the ice-bound condition of the river made it impossible to continue at that time. The 2 abutments and 7 of the 12 piers had been then completed, and some work on the piling and cofferdams of several others started.

Work on the superstructure had meanwhile been commenced, in September, 1904, and was continued as rapidly as progress on the piers would permit, until, when the temporary winter suspension occurred, 6 spans had been assembled in place, swung clear of the falsework and were in varying degrees of completion as to riveting. About two-thirds of the Washington approach embankment had also been completed.

About the middle of March, 1905, work was resumed on the substructure, and the remaining piers pushed rapidly to completion, the stonework of the last one being finished in the latter part of May.

The erection of steel was resumed in the early part of the latter month, and excellent progress was being made on it when the work was interrupted by a general strike among the bridgemen early in June.

This difficulty between the contractors and their employees had not been adjusted up to the end of the fiscal year, and no work was done on the erection of steel during the last half of the month. At this time 9 of the 11 fixed spans of the superstructure are assembled in place and swung clear of the falsework, of which 5 are practically riveted up complete.

None of the sidewalk railing or roadway or sidewalk paving is yet in place, but work on all of them is ready to commence.

The approach embankment on the Washington side, commenced in the fall of 1904, was built up gradually, mainly from building excavations in the vicinity, and was completed in the early part of June.

A contract was made in April, 1905, for the construction of the earth embankment for the Virginia approach, and work on the same was commenced early in June. Good progress has been made on it, it being about 25 per cent completed at the end of the month, with good prospect for its entire completion by about the 1st of September.

Unless unreasonably delayed by strikes or other contingencies now unforeseen it is expected that the main bridge and temporary paving of the approaches will be completed in the early fall of 1905 and opened to traffic.

Work has not yet been commenced on the short bridge crossing the head of Washington channel, the completion of which and the permanent paving of both approaches will not be possible before next season.

#### *Money statement.*

July 1, 1904, balance unexpended .....	\$968, 235. 44
Amount appropriated by District of Columbia appropriation act approved March 3, 1905 .....	200, 000. 00
Refund August 11, 1904 .....	1. 00
	1, 168, 236. 44
June 30, 1905, amount expended during fiscal year, for works of improvement .....	625, 032. 12
	543, 204. 32
July 1, 1905, balance unexpended .....	543, 204. 32
July 1, 1905, outstanding liabilities .....	1, 845. 00
	541, 359. 32
July 1, 1905, balance available .....	541, 359. 32
July 1, 1905, amount covered by uncompleted contracts .....	361, 640. 00
	11, 600. 00
Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance of improvement, in addition to the balance unexpended July 1, 1905 .....	11, 600. 00

#### CONTRACTS IN FORCE.

Contractor: The Pennsylvania Steel Company, of Philadelphia, Pa., for constructing the bridge.

Date of contract: August 29, 1903.

Approved: September 22, 1903.

Date for commencement: October 25, 1903.

Date for completion: February 1, 1905; time for completion of contract waived.

Rate: Substructure—northeast abutment, \$26,000; pier No. 1, \$26,200; pier, No. 2, \$26,780; pier No. 3, \$27,080; pier No. 4, \$27,460; pier No. 5, \$27,640; pier No. 6, \$29,620; pier No. 7, \$33,440; pivot pier No. 8, \$41,640; pile protection for pivot pier and guide sheers, \$16,300; pier No. 9, \$34,060; pier No. 10, \$30,380; pier No. 11, \$29,300; pier No. 12, \$29,600; southwest abutment, \$32,100. Superstructure—span No. 1, \$34,400; span No. 2, \$34,400; span No. 3, \$34,400; span No. 4, \$34,400; span No. 5, \$34,400; span No. 6, \$34,400; span No. 7, \$36,000; swing span No. 8, \$95,000; span No. 9, \$36,000; span No. 10, \$34,400; span No. 11, \$34,400; span No. 12, \$34,400. Total, \$914,200. Unit prices: Dredging, \$1.50 per cubic yard; foundation piles in place, 25 cents per linear foot; fender piles in place, 25 cents per linear foot; yellow-pine timber in place, \$50 per 1,000 feet B. M.; concrete No. 1 in place, \$7.50 per cubic yard; concrete No. 2 in place, \$7.50 per cubic yard; rock-face granite ashlar in place, \$30 per cubic yard; structural steel in place, 4½ cents per pound.

Contractor: Ernest L. Miner, of Petersburg, Va., for constructing earth embankment approach to highway bridge.

Amount: 70,000 cubic yards of earth.

Date of contract: April 24, 1905.

Approved: April 29, 1905.

Date for commencement: May 15, 1905.

Date for completion: August 31, 1905.

Rate: 64 cents per cubic yard.

*Emergency contracts in force.*

Contractor: The Cranford Paving Company, of Washington, D. C., for depositing material on approach to bridge.

Amount: 15,000 cubic yards.

Date of contract: July 18, 1904.

Date for commencement: July 23, 1904.

Date for completion: October 20, 1904.

Rate: 25 cents per cubic yard.

Contractor: Chas. G. Smith & Son, of Washington, D. C., for placing riprap stone at Virginia embankment of highway bridge.

Amount: 3,000 cubic yards.

Date of contract: July 27, 1904.

Date for commencement: August 1, 1904.

Date for completion: October 29, 1904.

Rate: \$1.53 per cubic yard.



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## APPENDIX C C C.

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### WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, AND WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, FILTRATION PLANT.

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*REPORT OF LIEUT. COL. SMITH S. LEACH, CORPS OF ENGINEERS,  
OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30,  
1905.*

OFFICE OF THE WASHINGTON AQUEDUCT,  
*Washington, D. C., July 20, 1905.*

GENERAL: I have the honor to forward herewith the annual reports for Washington Aqueduct, District of Columbia, and Washington Aqueduct, District of Columbia, filtration plant, in charge of Col. A. M. Miller, Corps of Engineers, until September 13, 1904, in charge of Capt. W. P. Wooten, Corps of Engineers, from September 14, 1904, to November 14, 1904, and in my charge since the latter date.

Very respectfully,

SMITH S. LEACH,  
*Lieut. Col., Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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## C C C I.

### WASHINGTON AQUEDUCT.

Appropriations for the Washington Aqueduct are applied to the improvement, maintenance, and repair of all those parts of the water supply which have been placed under the supervision of the Chief of Engineers. These are the masonry dam across the Potomac at Great Falls, the works there for regulating the supply to the conduit, the Conduit road from Great Falls to Washington, a distance of about 14 miles, the conduit from Great Falls to the distributing reservoir, the three reservoirs for supplying the city, the mains for delivering water from the reservoirs into the city's distributing system, 21 miles in aggregate length, the two bridges for carrying the mains across Rock Creek, and the new reservoir near Howard University and the tunnel connecting it with the distributing reservoir. A description of this work, etc., will be found in the Annual Report of the Chief of Engineers, 1903, page 2485.

The following statement shows the operations upon the aqueduct and its accessory works during the fiscal year and their condition at its close:

#### THE DAM AT GREAT FALLS.

Some small repairs were made to the riprap backing of the dam.

Twice during the year the deposit of mud just outside the mouth of the conduit was removed. The total amount removed was 311 cubic yards.

The feeder between the river and gatehouse was cleaned out, about 50 cubic yards of deposit being removed.

A new fence was built around the Government reservation at Great Falls.

#### GATEHOUSES AND BUILDINGS.

Gatehouses and buildings were repaired, painted, and whitewashed, gratings were placed in all floor openings of east shaft gatehouse, a wood ceiling was placed in Rock Creek pump house, new screens were made for the Georgetown distributing reservoir gatehouse, and all machinery was kept in good condition.

#### THE RESERVOIRS.

The grounds at the reservoirs were kept in good order, gutters, ditches, roads, and embankments were cleaned and repaired, and fences were repaired and whitewashed. The north end of the Dalecarlia reservoir has been shoaling rapidly in the past few years from the silt brought down by the conduit; during the year a small dredge was constructed and the channel leading from the conduit outlet to deep water in the reservoir was dredged out; 3,763 cubic yards of mud have been removed.

The flume at the north end of the drainage tunnel at the Dalecarlia reservoir, which was damaged by flood, was thoroughly repaired.

#### THE CONDUIT AND CONDUIT ROAD.

Gutters, ditches, culverts, and drains were cleaned and repairs made when necessary. Grass and weeds were cut along road embankments, and fences were repaired and whitewashed.

One thousand eight hundred and fifty linear feet of macadam road was built between the Club House and Great Falls, and small repairs were made to other portions of the road.

#### THE BRIDGES:

Small repairs were made to the bridges along the line of the aqueduct. The pipe bridge at Pennsylvania avenue across Rock Creek was repaired, the entire timber work being renewed.

#### THE MAINS.

Several small repairs were made to water mains, the vaults on pipe lines cleaned, and the valves worked and oiled.

CONSUMPTION AND WASTE OF WATER.

The following table gives the daily consumption of water as measured in June of each year since 1896:.

Date.	Daily consumption.	Population.	Amount per capita per diem.
	<i>Gallons.</i>		<i>Gallons.</i>
1896.....	44,113,574	<i>a</i> 274,815	161
1897.....	45,467,047	<i>b</i> 276,968	163
1898.....	47,288,733	<i>a</i> 277,548	170
1899.....	50,079,855	<i>a</i> 278,133	180
1900.....	50,897,227	<i>c</i> 278,718	183
1901.....	53,960,998	<i>a</i> 291,634	185
1902.....	57,474,790	<i>a</i> 304,550	189
1903.....	59,579,900	<i>a</i> 317,466	188
1904.....	66,193,900	<i>a</i> 330,382	200
1905.....	68,000,000	<i>b</i> 343,300	198

*a* Estimated.                      *b* Police census.                      *c* United States census.

The above figure for June, 68,000,000 gallons per diem, is the largest yet reached, and shows that the extravagant use of water has not culminated, but is still increasing. It is impossible to conjecture what figure of per capita consumption would finally be reached with waste allowed to go unchecked as at present.

Hitherto, criticisms of the per capita consumption of water in the District have been met by intimations that most of the surplus goes into Federal buildings or out of public fountains on Federal reservations.

The quantity of water used by the United States may now be closely estimated at 10,000,000 gallons per diem, based on actual meterings by the District authorities at a majority of the points of consumption. To give the water takers the benefit of every doubt, it may be assumed that this consumption is peculiar to this city and finds no counterpart in any other American city of similar size. Excluding this 10,000,000 from the total consumption, and taking the population of 1905 from the police census, a per capita consumption of 170 gallons results.

It is a waste of effort to discuss the question whether such per capita use is legitimate. It is well known that about one-half of it is inexcusable waste, and this conclusion is supported not only by statistics of consumption in other cities, but also by internal evidence from the records of supply to this city. It needs no superior perception to recognize waste when the measured supply to a purely residential district is nearly as great from midnight to 4 a. m. as from noon to 4 p. m., and when the minimum in any hour of the twenty-four is 60 per cent of the maximum supply in any hour of the same day.

When an increased supply of 35,000,000 gallons is suddenly demanded during an unusually cold spell in winter, it is impossible to avoid the conclusion that this quantity is deliberately wasted through fixtures left running to avoid freezing; and when a similar though smaller jump is coincident with a hot, dry spell in summer, the abuse of the hose privilege is the only rational explanation. The average water taker can quickly verify the fact of waste by an inspection of his own premises, and he may safely conclude that what is going on there is repeated in thousands of other premises.

Hitherto the waste has not seriously threatened the adequacy of supply or materially affected its cost, though during a part of the last winter the situation as to quantity was acute, and for a short time dangerous. From January 25 to February 28 the waste was so excessive that on one date, February 16, the quantity used and wasted was 103,000,000 gallons; on another date, the 7th of February, 101,000,000 gallons, and on fourteen other days during the period indicated, between 90 and 100 million gallons. As a result of this waste the reservoirs were depleted until the total reserve capacity was but one-third of the normal, and less than two-days' supply. This, notwithstanding the fact that the lowering of the reservoirs enabled the conduit to discharge the unprecedented quantity of 97,000,000 gallons. At its lowest stage the distributing reservoir contained 16 inches of ice and 4 feet of water, or 7 feet less than it should contain.

Though this situation was unprecedented and was passed without disaster, no risk of its recurrence can be accepted, because the next winter will find new limitations imposed, both as to supply and cost. The filtration plant, which will be put into operation before the next winter, has a maximum capacity of 75,000,000 gallons per diem. This capacity certainly can not be exceeded during prolonged cold weather without a serious diminution in the purity of the effluent. Any excess of supply over 75,000,000 gallons must, after filtration begins, be obtained by the introduction of unfiltered water into the mains, or, in other words, by a deliberate repollution of the purified supply. Such a course could be justified only in an emergency which no other possible measures could avert. Under any other circumstances it will be a crime against the public health, not punishable, perhaps, but no less a crime.

The question of cost is also worthy of consideration. In the future, every gallon of water wasted will mean a certain quantity of money wasted, which has not heretofore been the case. The total cost of filtration will be about \$6 per million gallons. A daily waste of 40,000,000 gallons means a daily useless draft of \$240 on the revenues of the water department.

In the past the question of the prevention of waste has been ignored, postponed, or evaded, because it was possible to do so. It is no longer possible. Measures of gradual, progressive application in a term of years offer no relief. What are required are measures which can be completely applied in a term of months, or better, of weeks. This condition excludes meters, which, if all opposition to them were withdrawn, would require several years for their complete installation.

The choice appears to be restricted to two methods: To reduce the pressure in the mains, or to seek out individual cases of waste and reduce the pressure on the premises. The former method impairs the fire protection, and inflicts punishment on offending and nonoffending users alike. It does particular injustice to metered users.

The second of the above methods, namely, the location of individual cases of waste and the reduction of pressure on the premises does not seem to be open to any serious objection. It is troublesome, probably somewhat costly, and domiciliary in character, but well within the reasonable scope of the operations of a municipal government. If enabling legislation is necessary in this particular case, it should be sought at the first opportunity.

Methods of waste prevention involving information by water officials and punishment by judicial process, have been tried here, and have failed. They should not be repeated.

Attention is invited to the danger of an interruption of the supply by an accident to the conduit. This structure has stood for nearly half a century, and without interruption in its use other than to empty it periodically for cleaning. This fact is no guarantee that it will not be interrupted in the future.

It includes six tunnels aggregating 3,700 linear feet in seamy rock, and unlined. They can not be lined until a new conduit is built. At every cleaning fragments of rock are found to have been dislodged from the roof. There is an appreciable risk of more or larger pieces falling in, sufficient to block the tunnel for a considerable time.

There are twenty-six culverts, nearly all in made ground, the failure of any one of which would break the conduit. They are of massive construction, but equally strong ones have been washed out, and these may be.

The Dalecarlia reservoir is formed by an earthen dam across a valley. In this dam is the by-conduit. If this dam should break, the by-conduit would be destroyed, and the supply of the District completely cut off.

The statement is justifiable that, notwithstanding its fifty years of uninterrupted use, the Washington Aqueduct is more vulnerable than the average of similar structures and that there is risk of an accident to it which would cut off the supply for a period long enough to cause a water famine, which would involve a cancellation of all fire insurance and a partial depopulation of the city, besides other and more calamitous consequences. This risk can be underwritten by the construction of another conduit, and in no other way.

The construction of a second conduit presents some important incidental advantages. It will settle the question of supply until the District contains more than twice its present population. If waste were effectively prevented, the two conduits would supply four times the present population.

The project for the second conduit should include adequate reservoirs, and may be made to more than double the present reserve supply. This will remove the single defect in the filtration scheme. It is conceded and has been officially stated that the filtration plant will probably not produce an effluent entirely satisfactory as to color at periods of maximum turbidity in the river. To double the reserve reservoir capacity will permit the head gates to be closed during periods of maximum turbidity and insure a clear effluent at all times. The increased sedimentation will slightly increase the capacity of the beds for a given cost of operation, or will reduce the cost for a given capacity.

With the idea of insurance paramount, the new conduit should not be built alongside the present one, but should follow a radically different course to reduce to a minimum the chance of a single cause disabling both. For this reason, all possible alternative routes should be examined and the preliminary surveys become more important and more extensive and will require more time.

An estimate of \$10,000 for these surveys is submitted, and its favorable consideration is urged. The cost of these surveys and any



probable cost of a second conduit will be a very cheap insurance against the interruption of the water supply, which will remain a constant menace to the District until such insurance is effected.

ESTIMATES.

For building combined storehouse and stable at Great Falls .....	\$3, 000
For preliminary surveys for additional conduit from Great Falls.....	10, 000
For operation, maintenance, and repair of the aqueduct and its accessories, including the Conduit road, the Washington City reservoir, and the Wash- ington Aqueduct tunnel.....	33, 000
Total .....	46, 000

Money statement.

Appropriated by act of April 27, 1904 .....	\$33, 000. 00
June 30, 1905, amount expended during fiscal year .....	30, 051. 61
July 1, 1905, balance unexpended .....	2, 948. 39
July 1, 1905, outstanding liabilities .....	2, 948. 39

Appropriations made for the Washington Aqueduct, with the dates of acts for the same.

Date.	Amount.	Date.	Amount.	Date.	Amount.
September 30, 1850....	\$500	March 3, 1878 <i>c</i> .....	\$43, 600	March 3, 1891 <i>k</i> .....	\$20, 000
August 31, 1852 <i>a</i> .....	5, 000	June 23, 1874 <i>d</i> .....	36, 400	July 14, 1892 .....	20, 000
March 3, 1853 .....	100, 000	March 3, 1875 .....	26, 000	March 3, 1893 .....	80, 000
March 3, 1855 .....	250, 000	July 31, 1876 .....	22, 000	August 7, 1894 <i>m</i> ....	82, 500
August 18, 1856 .....	250, 000	March 3, 1877 .....	15, 000	March 2, 1895 <i>n</i> .....	71, 500
March 3, 1857 .....	1, 000, 000	June 20, 1878 .....	15, 000	June 11, 1896 <i>o</i> .....	25, 000
June 12, 1858 .....	800, 000	March 3, 1879 <i>e</i> .....	20, 000	March 3, 1897 <i>p</i> .....	26, 000
June 25, 1860 .....	500, 000	June 4, 1880 <i>f</i> .....	20, 000	June 30, 1898 .....	22, 000
July 4, 1864 .....	150, 000	March 3, 1881 .....	20, 000	March 3, 1899 .....	25, 000
July 28, 1866 .....	142, 584	July 1, 1882 <i>g</i> .....	20, 000	June 6, 1900 <i>q</i> .....	37, 000
December 20, 1866 ...	12, 000	March 3, 1883 .....	20, 000	March 1, 1901 .....	22, 000
March 2, 1867 .....	20, 000	July 5, 1884 .....	20, 000	July 1, 1902 .....	33, 000
July 25, 1868 .....	52, 500	February 25, 1885 ...	20, 000	March 3, 1903 .....	33, 000
March 3, 1869 .....	25, 000	July 9, 1886 .....	20, 000	April 27, 1904 .....	33, 000
July 15, 1870 <i>b</i> .....	120, 822	March 3, 1887 .....	20, 000	March 3, 1906 .....	33, 000
March 3, 1871 .....	114, 196	July 18, 1888 <i>h</i> .....	20, 000		
June 10, 1872 .....	70, 555	March 2, 1889 <i>i</i> .....	20, 000	Total .....	4, 593, 657
January 23, 1873 .....	14, 000	August 6, 1890 <i>j</i> .....	25, 500		

NOTE.—Reverted to the Treasury: (a) \$2.81, (b) \$46.25, (c) \$560.87, (d) 35 cents, (e) \$1,109.87, (f) \$381.06, (g) \$1,354.17, (h) \$2,266.34, (i) \$4.12, (j) \$5,500, (k) \$2.49, (m) \$39.96, (n) \$2,983.87, (o) \$285.85, (p) \$1,828.53, \$4.38 from regular appropriation for Washington Aqueduct, \$1,824.15 from appropriation for constructing telephone line, and (q) \$1,450.02 from appropriations for protection to inlet at Great Falls and repairing by-conduit; total, \$17,816.56. Since 1878 one-half of the amounts appropriated has been contributed by the United States and the other half by the District of Columbia.

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, FILTRATION PLANT

At the beginning of the fiscal year the work was about 15 per cent completed and was in full progress.

The work done during the past fiscal year was partly by hired labor and partly by contract. Both classes were superintended by this office.

The force at present employed by the United States consists of: One assistant engineer, 1 superintendent, 1 draftsman, 9 surveymen, 27 inspectors, 1 messenger, 3 foremen and overseers, 2 storekeepers, and such machinists, blacksmiths, carpenters, painters, bricklayers, laborers, etc., as are necessary to carry on the work.

The work done by day labor and under proposal by circular letter constituted only a small portion of the whole and was as follows:

*Pumping station.*—During the year the brickwork, roof, gallery, floors, except under the electric generators, asphalt covering over coal vault, the vault lighting, and several other items were completed.



At the close of the year preparations were being made for boiler and pump tests, and the station was complete except for the installation of the electric generators and engines, the tiling, and finishing.

*Office and laboratory.*—The work on this building was begun during April, 1905, and at the close of the fiscal year the foundations, walls, roof, floors, and partitions were complete.

*Regulator houses.*—The foundation of No. 7 was built, Nos. 2 and 5 were built complete, the superstructures of Nos. 1, 3, and 4 were built, and the foundation and walls of No. 6.

*Controller house.*—This building was completed during the fiscal year except for plastering and painting.

*Shelter house.*—The foundation, walls, and roof of this building were built during the year.

The work done under formal contract was as follows:

*Babcock & Wilcox Co.*—The installation of boilers, mechanical stokers, and economizers by this company was completed early in the year, but, due to delays in installing the engines and pumps, this work was not tested.

*Henry R. Worthington.*—During the year this contractor completed the installation of main pumps and engines, and sand-washing pumps and engines, and steam piping. At the close of the year the main engines were being adjusted for final tests.

*Builders' Iron Foundry.*—During the fiscal year these contractors delivered and installed the registers for the 72-inch and 54-inch meters and delivered the remaining register and 29 indicators.

*Coffin Valve Company.*—These contractors completed their contract during January, 1905, by the delivery of the remaining valves, valve boxes, valve stems, and floor nuts.

*Virginia Portland Cement Company.*—During the fiscal year these contractors delivered 120,607.75 barrels of cement. The amount of cement delivered under this contract and the disposition made of it is as follows:

	Barrels.
Accepted prior to July 1, 1904.....	36, 908. 00
Accepted July 1, 1904, to July 1, 1905.....	118, 312. 50
Total accepted to July 1, 1905.....	155, 220. 50
Rejected prior to July 1, 1904.....	2, 492. 00
Rejected July 1, 1904, to July 1, 1905.....	2, 568. 50
Total rejected to July 1, 1905.....	5, 060. 50
Received and not yet acted on .....	2, 088. 00
Total received to July 1, 1905 .....	162, 369. 00

All cement was tested and was generally satisfactory. The main cause of rejection during the year was lack of fineness.

The progress of the work of the main contractors during the summer of 1904 was not considered satisfactory, and during January, 1905, schedules of operations for the ensuing season were prepared and submitted to the contractors. These schedules indicated to each contractor the quantity and location of work to be done during each month, from March to October. At the close of the fiscal year all work was up to schedule except as hereinafter noted.

*The Brennan Construction Company.*—These contractors have continued work as fast as the ground was available.

The work done during the year was as follows:

Steel-pipe system, 3,100 feet.  
Cast-iron pipe and specials, 1,100 tons.  
Sand-washer system:  
    1,062 feet of 12-inch pipe.  
    1,501 feet of 10-inch pipe.  
    1,083 feet of 6-inch pipe.  
    1,047 feet of 4-inch pipe.  
Pressure-pipe system, 5 regulator houses.  
Exterior drainage system:  
    979 feet of 8-inch tile pipe.  
    1,250 feet of 18-inch tile pipe.  
    180 feet of 20-inch tile pipe.  
    3,350 feet of 24-inch tile pipe.  
    10 manholes.  
    26 catch basins.  
Central underdrains, 4,812 feet.  
Interior drainage system, 21 filters.

The percentage completed is as follows:

	Per cent.
Steel-pipe system.....	100
Cast-iron pipe and specials.....	100
Sand-washer system.....	79
Pressure-pipe system.....	71
Exterior drainage system.....	98
Central underdrains.....	98
Interior drainage system.....	72

The progress made by this contractor has equaled that required by the schedule with a few trifling exceptions, which will in no way delay the final completion of the work.

*Cowardin, Bradley, Clay & Co.*—The amount of work of the various classes done by these contractors, with the amounts remaining to be done, are as follows:

	From July 1, 1904, to July 1, 1905.	Amount remaining.
Concrete in floors.....cubic yds..	26,840.98	.....
Concrete in walls.....do....	17,655.53	.....
Concrete in piers.....do....	6,877.35	.....
Concrete in vaulting.....do....	34,207.84	.....
Total concrete.....do....	85,581.70	6,830
Materials in masonry.....filters..	25	3
Drainage of roofs.....do....	25	4
Sodding.....square yds..	2,553	14,500
Excavation.....cubic yds..	178,815	21,900
Embankment.....do....	192,975	.....

The remaining excavation consists of about 14,900 cubic yards in bed 10 and about 7,000 cubic yards in the courts. The time of completion of bed 10 will determine to a large extent the completion of the whole on account of the interference of this work with all other work on the plant.

At the end of the year the plant in use or available for use consisted of:

*For excavating.*

2 steam shovels.  
36 wheel scrapers.  
33 dump wagons.  
10 dump carts.  
3 steam rollers.  
1 traction engine.  
1 grader.  
1 road scraper.  
1 locomotive crane (with O. P. bucket).  
5 standard-gauge locomotives.  
21 4-yard dump cars.  
4 6-yard dump cars.  
100 mules.

*For concreting.*

1 cableway.  
1 cableway (dismantled).  
1 derrick "A" frame.  
2 derricks (dismantled).  
2 mixers, No. 5 Smith.  
1 mixer, No. 5 Smith (dismantled).  
3 narrow-gauge locomotives.  
15 steel concrete cars.  
41 flat cars.  
62 concrete buckets.  
1 conveyor, complete.

The embankment under filters was completed during the year. The remaining embankment consists of filling around and over filters and trimming various slopes.

During the year the progress of the concrete work has been satisfactory and has always been up to that of the excavation and embankment. The quality of the concrete has been good.

This contractor has fallen behind his schedule in beds Nos. 6, 7, 10, and 11, due to tardiness in excavating. He had, however, run ahead of the schedule as far as beds Nos. 25 to 29 were concerned.

*L. E. Smoot.*—During the fiscal year this contractor has placed 95,008 cubic yards of filter sand and 23,011 cubic yards of filter gravel.

Fifteen beds have been completed and four partially completed. This work is practically up to schedule.

The plant from which sand is obtained is situated at Laurel, Md., and is capable of furnishing about 1,200 cubic yards of sand per day of ten hours when run to its full capacity. Only half the plant has been utilized to the present time.

*Money statement.*

July 1, 1904, balance unexpended .....	\$2, 302, 129. 17
June 30, 1905, amount unexpended during fiscal year.....	1, 325, 445. 11
July 1, 1905, balance unexpended .....	976, 684. 06
July 1, 1905, outstanding liabilities.....	\$12, 761. 20
July 1, 1905, amount covered by uncompleted contracts... 558, 677. 01	
	571, 438. 21
July 1, 1905, balance available .....	405, 245. 85

## AMOUNTS AND DATES OF APPROPRIATIONS FOR THE WORK.

June 6, 1900.....	\$200, 000
March 1, 1901 .....	500, 000
July 1, 1902 .....	600, 000
July 1, 1902 (deficiency) .....	250
March 3, 1903 .....	600, 000
April 27, 1904 .....	1, 568, 155
Total .....	3, 468, 400

2618 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Abstract of contracts in force June 30, 1905.

Name.	Rate.	Date of approval.	Date of expiration.
Virginia Portland Cement Co., for "Old Dominion" cement, net per barrel.....	\$1.68½	Apr. 1, 1903	Dec. 1, 1904 <sup>a</sup>
Brennan Construction Co.:			
Steel-pipe system, lump sum.....	72,800.00	Apr. 15, 1903	Do. <sup>a</sup>
Cast-iron pipe, lump sum.....	75,000.00		
Sand-washer system, lump sum.....	24,000.00		
Pressure-pipe system, lump sum.....	1,200.00		
Exterior drainage system and manholes, lump sum.....	25,000.00		
Central underdrains in filters, per linear foot.....	1.65		
Interior drainage system, per filter.....	500.00		
L. E. Smoot:			
Filter gravel, per cubic yard.....	2.75	Apr. 20, 1903	Do.
Filter sand, per cubic yard.....	2.65		
Cowardin, Bradley, Clay & Co.:			
Excavation, embankment, and filling, per cubic yard...	.30	Apr. 24, 1903	Do. <sup>a</sup>
Puddle, per cubic yard.....	1.00		
Seeding, per acre.....	75.00		
Sodding, per square yard.....	.25		
Concrete floors, per cubic yard.....	4.50		
Concrete in walls, per cubic yard.....	5.10		
Concrete in piers, per cubic yard.....	6.00		
Concrete in vaulting, per cubic yard.....	6.50		
Granolithic pavement, per square yard.....	.90		
Placing materials in masonry, per filter.....	200.00		
Drainage of roofs, per filter.....	266.00		
Builders Iron Foundry:			
20-inch Venturi meters, each.....	280.00	June 11, 1903	Do. <sup>a</sup>
Castings, etc., for 72-inch meter.....	850.00		
Castings, etc., for 54-inch meter.....	700.00		
Register for 72-inch meter.....	680.00		
Register for 54-inch meter.....	680.00		
Henry R. Worthington:			
Main pumping engines, each.....	14,000.00	June 17, 1903	Do. <sup>a</sup>
Pumping engines, sand-washing, each.....	4,060.00		
Babcock & Wilcox Co.:			
Boilers, each.....	3,669.75	June 10, 1903	Do. <sup>a</sup>
Mechanical stokers, each.....	1,034.50		
Economizers, each.....	2,528.00		
William Bayly Upton, engineering work for electric lighting plant, lump sum.....	1,200.00	Feb. 3, 1905	Oct. 10, 1905
The S. H. Calkins Co., furnishing and laying tile:			
Wall tile, per square foot.....	.56		
Floor tile, per square foot.....	.40	Apr. 3, 1905	June 3, 1905
Thomas W. Power, electric lighting plant, Class C.....	6,069.00	June 23, 1905	Sept. 23, 1905
The Brennan Construction Co., electric lighting plant, Class D.....	7,554.00	.....do.....	Do.

<sup>a</sup> Time limit for completion of contract waived.

## APPENDIX D D D.

### IMPROVEMENT AND CARE OF PUBLIC BUILDINGS AND GROUNDS IN THE DISTRICT OF COLUMBIA—WASHINGTON MONUMENT.

*REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1905. OFFICER IN  
CHARGE, COL. CHAS. S. BROMWELL, U. S. ARMY.*

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**INTERIOR VIEW NEW PLANT HOUSE, PROPAGATING GARDENS.**

**New plants in the foreground, described by Geo. H. Brown, landscape gardener.**

**OFFICE OF PUBLIC BUILDINGS AND GROUNDS,**  
*Washington, July 20, 1905.*

**GENERAL:** I have the honor to submit the following report of operations upon public buildings and grounds in the District of Columbia under the Chief of Engineers during the fiscal year ending June 30, 1905:

Besides the care of public buildings and grounds, this office has also been charged with additional duties, as follows:

1. The preservation, care, and safety of buildings occupied by the War Department in the District of Columbia, except the State, War, and Navy Departments building.

2. The care and repair of the Government telegraph line connecting the Capitol with the various Departments and with the Government Printing Office.

3. The immediate charge of the banks of the Potomac River from the north line of the Arsenal (or Washington Barracks) grounds to the southern curb line of N street SW.

4. Care of the building on Tenth street NW. where Abraham Lincoln died.

5. Such matters connected with the erection of the statue of General Sherman as may properly devolve upon the War Department.

6. The monument at Wakefield, Va., the birthplace of Washington, and the iron pile dock at the mouth of Bridge Creek, Virginia.

7. The erection, in the national military park at Gettysburg, Pa., of a memorial tablet to Abraham Lincoln.

8. Executive and disbursing officer of the Sheridan Statue Commission.

9. Since March 6, 1901, executive and disbursing officer of the Grant Statue or Memorial Commission.

10. Since May 4, 1901, the same for McClellan Statue Commission.

11. Since August 11, 1901, in charge of the portion of Potomac Park between the tidal reservoir and the Washington Monument grounds, and between Seventeenth street and Virginia avenue NW., and Maryland avenue and Fourteenth street SW., called hereafter Monument Park Annex; and since November 25, 1903, of the portion between the Virginia channel of the Potomac River, the tidal reservoir, and the causeway of the Pennsylvania Railroad bridge.

12. Since July 26, 1902, in charge of the erection of a monument at Fredericksburg, Va., to the memory of Gen. Hugh Mercer.

13. Since December 17, 1903, executive and disbursing officer of the Pulaski Statue Commission and of the Von Steuben Statue Commission.

14. Since May 6, 1904, executive and disbursing officer of the Jefferson Statue Commission.

## PUBLIC BUILDINGS.

## MAINTENANCE OF THE EXECUTIVE MANSION, PRESIDENT'S OFFICE BUILDING, STABLE, AND GREENHOUSES.

## EXECUTIVE MANSION.

*East Room.*—The window draperies in this room were relined.

*Main Corridor, first floor, etc.*—The columns were touched up with paint and the passageway between the East Room and the entrance vestibule were painted.

*State Dining Room.*—Broken parts of the marble base around this room were removed and replaced with new marble. The mounted animal heads on the walls were taken down, cleaned, some of them repaired, and all replaced. These heads were protected by linen covers in the summer. Two large mahogany tables were refinished.

*Usher's Room, first floor.*—The ceiling and woodwork were painted.

*Corridor, second floor.*—The woodwork in the entire corridor was painted, and walls in west corridor re-covered with burlap.

*Library Room.*—The old mantel in this room was removed and replaced with a new mantel of Italian marble, and the fireplace relined.

*Small southeast bedroom.*—The ceiling and woodwork were painted.

*Large southeast bedroom.*—The ceiling, walls, and woodwork were painted.

*Southeast bathroom.*—The plastering on the north wall was removed and the wall replastered. The walls were painted.

*Small northwest bedroom.*—The furniture was re-covered.

*Southwest dressing room.*—The walls were repapered and the ceiling painted.

*New bathrooms.*—The work of remodeling the northwest bathroom and the southwest bathroom, second floor, which was commenced in July, 1905, was completed the next month, August. The old partitions were taken down, new wire lath and plaster partitions on steel stud-ding erected in new positions, new doorway openings cut into the corridor and the old doorways closed, necessary papering and painting done, marble floors laid and tiled, wainscoting put up, and a new bath tub, new water-closet, and new lavatory put up in each room in place of the old fixtures removed.

*Basement Corridor.*—The furniture was re-covered.

*Diplomatic Assembly Room.*—The frames of the gold furniture were regilded.

*Dressing room, basement.*—The walls, ceiling, and woodwork were painted.

*Electrician's room, basement.*—The walls, ceiling, and woodwork were painted.

*Basement Corridor.*—Parts of the ceiling were painted.

*Elevator.*—Four new steel cables were placed on the elevator. The guides on the bottom were rebabbitted, two new guide-rail shoes placed on car and new brake shoes placed on bottom of motor. The motor which operates the dumb waiter was reset on a new and more solid foundation. Some painting was done to the walls and doors in the elevator shaft.

*Basement area.*—The old wooden paling gates at the entrance to the passageway under the north portico were taken down and replaced with new wooden doors.

*Floors.*—The hard-wood floors were cleaned down to the natural wood, bleached, sandpapered, refilled, and shellacked. Thereafter during the year they were waxed and cleaned as required.

*The stairways.*—The walls and ceilings of the main stairway from the first to the second floor and the door and window frames, and the hallways and the ceiling and the iron staircase and hand rail of the back stairway were painted.

*The attic.*—The walls, ceilings, and woodwork of the servants' and other rooms in the attic, including the bathroom and the hallway, were painted.

*The Terraces.*—The walls and ceilings of three servants' rooms and the hallways in the West Terrace were painted. During the first part of the fiscal year blistered spots on the exterior walls of the terraces were scraped and painted and the coping and bases of the East Terrace were touched up with paint. In June, 1905, work was commenced burning off the old paint from rough and blistered places on those walls and touching up those places with one coat of paint preparatory to repainting both terraces.

*Vacuum sweeping system.*—This system was introduced for cleaning rooms, carpets, draperies, furniture, etc.

*Miscellaneous repairs.*—The hardware on doors and windows was repaired and mahogany doors were refinished where necessary. Minor repairs were made to tin roof and the woodwork around two of the attic windows and the valley gutters and part of the roof over the south front of the building were painted. A new metal eagle, gilded, was placed on the flagstaff on roof. The roof of West Terrace was repaired. Broken glass was replaced with new glass.

*Plumbing and lighting, etc.*—Necessary attention was paid to the plumbing fixtures and repairs made as required. Loose tiles in four bathrooms were taken down and reset. A new water-closet was placed in the northeast bathroom in place of a broken one. The large filter which filters the house water supply was taken apart, thoroughly cleaned, new plates, gaskets, and filtering material put in and the filter placed in good working order. The water pipe on the East Terrace was extended by running 242 feet of additional pipe for use in watering the trees and plants on the terrace.

The electric light, electric bell, and telephone systems were cared for. Eight of the electric-light posts on the terraces were rewired in the summer of 1904; burned-out lamps throughout the Mansion were replaced with new lamps, as required. A new electric-light fixture was placed in the florist's room in West Terrace. A new watchman's time detector was purchased and placed in position in place of an old detector removed.

The equipment of the electric-light posts in the East Terrace was entirely reconstructed in June, 1905. The old conduits and wires have been abandoned and a new line of pipe conduit has been run along the outside surface of the balustrade, connecting through junction boxes at each post with fuse blocks, which protect each individual lamp. The posts were taken down and new iron rods for holding them put in. In order to make the fixtures firm and not easily displaced lock nuts were used to clamp them to the supporting rods. Lead-covered wires were used through the posts from the lamp to the junction box. Lead-covered wire was also laid beneath the cement floor of the terrace from the panel board in the Mansion to feed the line of conduit around the

balustrade. At the panel board one switch now controls all the post lights in place of eight switches, as heretofore. As now installed, the chances of trouble on these circuits has been reduced to a minimum, and every wire is easily accessible. The necessity for this work arose from the fact that most of the old pipes were filled with water, due to condensation, and the wires not being waterproof were continually grounding and burning out. The old pipes being too small to admit of putting in new lead-covered wires, or in the longer lengths even to pull out the older wires, it was necessary to reconstruct the entire system. The posts were also very insecurely held together, and often broke apart when struck by the trees in tubs which ornamented the terrace. The work of rewiring the posts on the West Terrace in same manner was commenced in June, and it is expected will be completed in July of the new fiscal year. The two circuits to the police room in the East Terrace that have been out of order for some time were repaired in June by digging out the concrete around them and clearing the grounds.

*Portraits.*—The frames of some of the large portraits were repaired and regilded and the portraits touched up.

*Furniture and furnishings.*—The frames of all furniture were cleaned and polished and repairs made as required, and some minor articles purchased. Some new straw matting was purchased and laid in the servants' rooms in the attic and the West Terrace. Repairs were made to the plush covering of walls of Green Parlor. Mattresses were repaired.

In the autumn of 1904 the rugs and carpets which had been removed from the floors in the preceding summer and stored in the Government storehouses at the propagating gardens were returned to the Mansion and relaid and the lace curtains and other window draperies rehung. In May and June the portieres, window hangings, and lace curtains were taken down, cleaned and packed in boxes, except the laces which were sent away to be cleaned and repaired, slip covers placed on furniture, window screens put in, window awnings put up, and rugs and carpets taken up, cleaned, and stored for the summer. The walls of the three parlors on drawing-room floor were covered with loose linen covers for summer protection.

In the late autumn the bay trees on the terraces were removed to the greenhouses and their places filled with holly and evergreen trees. Thirty-four large new boxes or tubs were made for the bay trees.

*Social functions.*—During the year the preparations required for such occasions were made for three state dinners, the New Year's reception, four evening official receptions, four afternoon receptions, eight dinners, one luncheon, five afternoon teas, two lectures, and three musicales. After those functions were over furniture was replaced in position and the house restored to its usual condition.

*Inventory of property.*—Sundry civil act approved April 17, 1900, volume 31 (p. 97), provides:

And hereafter a complete inventory, in proper books, shall be made annually by the steward, under the direction of the officer in charge of public buildings and grounds, of all the public property in and belonging to the Executive Mansion, showing when purchased, use to which applied, cost, condition, and final disposition, to be submitted to Congress with annual report of officer in charge of public buildings and grounds.

In compliance with this law, as complete an inventory as was possible to be made has been prepared and is submitted with this report as Appendix A.

*President's Office building.*—Slat doors were placed at the doorways of three rooms. Several new file cases were built and some new shelving and a three-light electric fixture put up in the file room in basement. The hard-wood floors in three rooms were cleaned, filled, and varnished, and some of the floors were shellacked. A leak in the roof was repaired. Repairs were made to the hot-water boiler and to the plumbing fixtures. The large filter was taken down, cleaned, repacked, replaced, and reconnected. An auxiliary water supply was introduced by placing an iron tank of one hundred gallons capacity in the attic, which will supply water to the plumbing fixtures for a short time in case the water from the mains should be temporarily shut off. The ceiling in the President's reception room and the ceiling in the press room were repainted.

*Stable of Executive Mansion.*—A bath tub was placed in the bathroom on the second, or living, floor, and the stairway to that floor was painted, stained, and varnished. Broken glass in skylight and windows was replaced with new glass. A 40-gallon hot-water boiler was put in in place of an old boiler. Twenty-five feet of cast-iron drain pipe was laid from the drain trap at the southeast corner of the building and connected with sewer.

*Stables of Public Buildings and Grounds.*—A new box stall was constructed. The sill under the west side of the building, which was badly decayed, was replaced with a new sill. Six stalls, the wainscoting, doors, door frames, window frames, and sashes, and the floors of the stall room and carriage house were painted. Broken glass was replaced with new glass and three sashes were reglazed. A new water-closet and flush tank were placed in the building, and a hopper and flush tank were placed in the workmen's closet on the outside of the building on the east side. Repairs were made to water pipes and connections.

*Greenhouses of the Executive Mansion.*—These greenhouses are located at the propagating gardens on the Monument grounds. The plants in these houses received all necessary attention and were kept in good condition. Broken glass was replaced with new glass. Repairs were made to the woodwork of the houses, and considerable minor painting was done. The roof of the rose house was reglazed. Some new board walks were laid in the houses. A center bench was put up in each of two houses. The exterior brick walls of the houses and the potting shed were whitewashed. The exterior of three of the houses and the roof of the potting shed and sashes of plant frames were painted. The exterior bases of the walls of all the houses were also painted.

A new sectional hot-water boiler was placed in the large furnace room. One of the boilers was repaired and flues, smokestacks, and boilers were cleaned, leaking joints of hot-water pipe recalked, and valves of steam pipes repacked. An additional line of 1½-inch pipe was placed under north bench of rose house, and a door was hung at the entrance of the furnace room of the bay tree house.

A new hotbed was constructed.

Three additional greenhouses were constructed. Two of these are each 130 feet long, 23 feet wide, and 16 feet high, and one is 170 feet



long, 20 feet wide, and 15 feet high. The last-named house is used for storing the bay trees from the terraces of the Executive Mansion during the winter months.

Work was commenced in May, 1905, for constructing two additional greenhouses, each to be 130 feet long, 13 feet wide, and 12 feet high. By the end of June the wooden sides of the houses had been constructed to a height of 4 feet from the ground and five of the plant stages built.

*Grounds of the Executive Mansion.*—Lawns were mown and their margins edged, bare places on them sodded or sown with grass seed, gravel and macadam roads raked and rolled, and paved walks and gutters cleaned. Some old trees were cut down and dead wood cut from others. Manure was spread on the lawns in the south grounds and on portions of the lawns in the north grounds. This was allowed to remain during the winter and in the spring was raked in and the refuse removed. Additional irrigating facilities were provided for these grounds by laying 262 feet of 1½-inch galvanized iron pipe and 400 feet of 2-inch pipe. Uneven portions of the flagging at the east side of the grounds were taken up and relaid. Repairs were made to the basins of the three fountains. New 2-inch pipe was run around inside the basin of the south fountain to supply the side jets, which were increased from 16 to 32 and adjusted to be at the same angle. Additional water pipe was run to give an increased supply of water to this fountain. For this purpose 432 feet of 4-inch cast-iron pipe and 166 feet of 3-inch cast-iron pipe were run from the water main in West Executive avenue at the southeast corner of the State Department building into and through the Executive Mansion grounds to the fountain. A drain 75 feet long was laid across the grounds south of the office building. A new platform was made for the band stand used at the concerts given in these grounds in summer, and a shed was built back of the Executive Mansion stable to store the stand when not in use.

In the colonial gardens, immediately south of the East and West terraces of the Mansion, lawns were mown, hedges trimmed, gravel walks rolled, flower beds cared for, additional plants and vines set out, and cobblestone gutters laid. In accordance with the usual custom the grounds were thrown open to the children for the "egg rolling" on Easter Monday, April 24, from 9 a. m. to 1 p. m. Stakes were set and wires run on them around the shrubbery and along the east and west slopes of the grounds. These temporary fencings were afterwards removed and the grounds cleaned. The cost of cleaning and restoring the grounds after this occupancy was \$60.

The amount appropriated for the grounds inside the iron fence (\$4,000) is hardly sufficient for the maintenance of the grounds in a creditable condition. It is recommended that the amount for maintenance be increased to \$5,000.

#### HOUSE NO. 516 TENTH STREET NW., WHERE ABRAHAM LINCOLN DIED.

This property was purchased by the United States in November, 1896, since which date it has been under the supervision of this Office.

By authority of the Secretary of War, dated October 9, 1899, Mr. O. H. Oldroyd is allowed to occupy this building with his family, as custodian, without pay, and to exhibit his Lincoln Museum and to charge a small entrance fee therefor.



During the year minor repairs were made to the plumbing and the small window on the alley side of rear building was enlarged to twice its original size and a new frame and sash made and set in place. In June, 1905, the brick front of the building was painted with three coats of red paint and penciled white, and the window sills, doors, and door frames, window frames, sashes, and blinds painted with two coats of paint.

HOUSE NO. 204 L STREET NW.

On December 6, 1904, the United States, through the Department of Justice, obtained possession of this property, being a part of lot 8, in square 558. The property escheated to the United States for the reason that the owner died intestate and no natural heirs were discovered. It came under the charge of the Chief of Engineers in pursuance of section 1797, Revised Statutes, as amended by the act of April 28, 1902. There is a two-story, four-room and summer kitchen frame house on the lot, which is now occupied, under a monthly lease, by a tenant at a monthly rental of \$12.30, payable in advance. The house was old and much in need of repair, and in May, 1905, this Office asked to be informed whether the necessary repairs could be made from the appropriation for "Contingent Expenses, Public Buildings and Grounds." The Acting Comptroller of the Treasury decided, under date of June 16, that the appropriation was applicable to the purpose if the repairs were authorized by the Department, and on June 19 the necessary repairs were authorized by the Chief of Engineers. Work was commenced at once, and by the end of the month repairs had been made to the doors and windows, all decayed wood-work, and the plastering. The rooms were also whitewashed.

BUILDINGS OCCUPIED AS OFFICES BY THE WAR DEPARTMENT, EXCEPT STATE, WAR, AND NAVY DEPARTMENT BUILDING.

By order of the War Department, dated June 30, 1893, all buildings occupied as offices by the War Department, except the State, War, and Navy Departments building, were placed under the charge of this Office, so far as their preservation, care, and safety are concerned. Between July 1, 1904, and June 30, 1905, the buildings thus occupied were thirteen in number, as follows:

- Army Medical Museum and Library, Seventh and B streets SW.
- Ford's Theater Building, 511 Tenth street NW.
- Annex to Ford's Theater Building, 509 Tenth street NW.
- No. 610 Seventeenth street NW., Record and Pension Office, War Department.
- Southwest corner of Seventeenth and F streets NW., office depot quartermaster, United States Army, and photograph gallery, Adjutant-General's office.
- No. 1725 F street NW., branch printing office, War Department.
- No. 1712 G street NW., publication branch, Record and Pension Office, War Department.
- No. 1744 C street NW., Board of Ordnance and Fortification, Signal Office. etc.
- No. 1814 G street NW., Medical Dispensary, United States Army.
- Annex to Winder Building, Ordnance Department, United States Army.
- War Department stables, G street, between Seventeenth and Eighteenth streets NW.
- Lemon Building, No. 1729 New York avenue NW., occupied by Division of Military Information of General Staff, Supply Division, War Department, etc.
- No. 601 Eighteenth street NW., occupied as an annex to the Insular Bureau of the War Department from July 1 to September 1, 1904.
- No. 1800 F street NW., occupied as an annex to the Insular Bureau of the War Department from September 1, 1904, to June 30, 1905.
- On September 1, 1904, the building No. 601 Eighteenth street NW. was given up by the War Department, and the one at No. 1800 F street NW. occupied in its place.

Monthly inspections have been made of these buildings during the year, and they are believed to be in good and safe condition for the purposes for which they are being used.

#### ARMY MEDICAL MUSEUM AND LIBRARY.

On April 17, 1905, this Office was instructed by the Chief of Engineers to take charge of the construction of six new iron book stacks to be erected in the library hall of the Army Medical Museum and library building under the appropriation of \$8,000 provided in sundry civil appropriation act approved March 2, 1905, for the purpose.

After consultation with the officer of the Medical Department of the Army who was in charge of the library it was decided that the new book stacks should follow the general plan of the present book stacks in the building, and on May 10 proposals for the erection of the new stacks were invited by newspaper advertising, and bids were opened on May 31. The lowest bidder was the only one who submitted a proposal in accordance with the specifications, but his bid was rejected because of informalities, by order of the Department, and new bids invited by circular letter of June 13, opened on June 23. The lowest proposal was accepted on June 30, and a contract will be entered into for the work.

#### THE WASHINGTON NATIONAL MONUMENT.

The usual care was taken to maintain the Monument and its machinery in good condition and to keep the interior of the shaft clean. The walls, stairs, and landings were swept whenever necessary, and all the machinery at the top and in the drum pit examined and thoroughly cleaned, that in the pit painted, and the walls in the pit and in shaft from pit to motor room whitewashed. The floorman's room on the top landing was cleaned and painted and an electric heater placed in it. The box oil lanterns on landings which light the shaft when electric lights are not in operation were taken down, cleaned, and painted.

The iron platforms of the stairway were scrubbed with lye water, and markings on walls, tablets, and painted work erased. New wooden shutters were made and fitted to the window openings at the top to improve ventilation and keep out the rain. The old windows and the woodwork around them were taken out and new frames made and fitted to each window. When not in use they are taken out and placed in a rack. In June, 1905, work was commenced scraping and painting the ironwork of the stairway and the columns supporting them, and the elevator guides. This ironwork was scraped and touched up with graphite and paint down 200 feet from the top. The ironwork was then entirely repainted on the north side for the same distance, on the south side down 100 feet, and on under side of stairway down 150 feet. The large doors at the entrance were repaired, a pair of iron folding gates set up in place of the old wooden gates, and two new brass sills placed in position. A revolving door was also placed at this entrance. A new steam heater was set in place in the northwest corner on bottom floor.

The copper roof, iron railing, window frames, and exterior brick walls of the motor room were painted and the interior of the room was cleaned and painted. Arrangements were made for heating the room

with steam from the pipes that are to heat the waiting room on lower floor of the Monument. A new door was made for the steam trap pit. All the machinery was carefully cleaned whenever necessary.

In October and November, 1904, the old hoisting cables and counterweight cables showed such pronounced signs of wear that an appropriation for new cables was recommended, and on November 30 the elevator was shut down until such time as they could be procured. Congress having made an appropriation of \$2,500 for new cable in the urgent deficiency act approved January 5, 1905, proposals were invited, and a contract entered into January 17, 1905, for their installation. The work of installing the new cables (two hoisting cables and two counterweight cables) was completed in a most satisfactory manner on February 21, two days in advance of the contract time. The cables are each 1,070 feet long and  $1\frac{1}{4}$  inches in diameter. They are of the best steel wire, made up of six strands wound around a hemp center, each strand containing 19 wires of three different sizes. Tests of the cables showed them to have a tensile strength of 130,000 pounds. After the new cables were in place and all adjustments made, the elevator was tested by loading it with a weight of 6,000 pounds. In connection with the installation of these new cables, the sheaves at the top were smoothed off and the drum gear under the bottom floor was adjusted to take up the back lash. The elevator was opened to the public on February 27, 1905, after having been shut down since December 1 previous. A new 8-wire flexible controller cable was also purchased and connected up with the elevator car and the junction box at the 270-foot landing, also independent telephone wires for the car were placed.

The electric elevator and its machinery were, with three exceptions, inspected once each month by a casualty company of New York, who furnished monthly certificates of their good condition. These exceptions were in the month of August, when new boilers were being installed in the power house, and in December and January, when the new cables were being placed in position. In addition to these monthly inspections, daily inspections were made by the employees of the Monument of the safety appliances on the elevator before starting to carry passengers, and a test of those appliances was made twice each week also by the employees.

On June 18, 1904, a contract was entered into for furnishing and placing in position two new 80-horsepower horizontal boilers in the power house. On July 25 the plant was shut down and work commenced removing the old boilers, which were hauled to the storage yard at the propagating gardens. The work of installing the new boilers was commenced August 2 and completed by the end of the month, and the plant started up September 1.

In the power house all the machinery in the engine room and boiler room was carefully examined from time to time, maintained in a cleanly condition, and repairs made as required. The boilers were opened regularly, washed out and cleaned of scale, etc. Considerable painting was done about those two rooms, and in the boiler room some whitewashing was done.

A reception room was constructed on the lower floor of the Monument. The frame of the room was built of steel I beams and channel irons, with concrete walls and ceiling. The roof is covered with mastic, the walls are of adamant plaster, painted, and there is a marble

wainscot and mosaic floor. There are two doorway entrances, with wooden and glass doors. The room will be lighted with electric lights, heated by steam, and furnished with four oak settees for the accommodation of visitors waiting for the elevator.

In the lodge house necessary painting and whitewashing was done, and the tin roof was repaired and painted.

The following table shows the number of visitors to the top of the Monument each month, both by the electric elevator and by the stairway, the total number during the year, and the aggregate number since the shaft was opened to the public, October 9, 1888:

Month.	Number by the electric elevator.	Number by the stairway.	Total.	Aggregate since Oct. 9, 1888.
1904.				
July.....	7,945	2,830	10,275	2,458,081
August.....		7,833	7,833	2,460,414
September.....	12,432	2,739	16,171	2,476,585
October.....	12,890	2,144	14,584	2,491,119
November.....	7,829	1,163	8,992	2,500,111
December.....		4,038	4,038	2,504,149
1905.				
January.....		2,293	2,293	2,506,442
February.....	628	2,584	3,212	2,509,654
March.....	18,846	10,727	24,573	2,584,227
April.....	12,294	8,169	15,463	2,549,690
May.....	11,141	1,840	12,981	2,562,671
June.....	9,730	1,208	10,938	2,573,609
Total.....	89,235	41,568	130,803	.....

In April, 1905, a large register book was placed on a standing desk on the top floor in order that visitors might register their names. In May 7,336 availed themselves of that privilege and in June 6,430, a total of 13,766.

During the months that the steam plant was not in operation visitors ascended by the stairway, and the interior of the shaft was lighted by the kerosene-oil lanterns which are in place over the landings.

*Data relative to Washington Monument.*

Height above mean low water.....	596 feet 4½ inches
Height above doorsill .....	555 feet 5½ inches
Side of base... {outside.....	55 feet 1½ inches
{inside.....	25 feet
Depth of foundation (sand and clay).....	38 feet
Foundation on a side.....	126 feet 6 inches
Area.....	16,002.25 square feet
Top, side of Monument.. {outside.....	34 feet 6 inches
{inside.....	31 feet 6 inches
Walls, thickness .....	15 feet ½ inch
{base.....	18 inches
{top.....	
Weight of capstone....	3,300 pounds
Weight of the whole Monument.....	81,120 tons
Mean pressure at base.....	5 tons per square foot
Pressure on foundation nowhere greater per square foot than.....	9 tons
Near edges, less than.....	3 tons
(Coast Survey Report, December 1, 1884.)	
Taper of Monument.....	¼ inch to 1 foot
Memorial stones (beginning at 30 feet, stopping at 280 feet).....	179
Steps.....	898
Landings.....	50

Windows, at top only.....	8
Six are 3 feet by 1 foot 4 inches.	
Two are 3 feet by 2 feet.	
Cost.....	\$1,300,000
Corner stone laid July 4, 1848.	
Capstone set December 6, 1884.	
Dedicated February 21, 1885.	
Elevator, electric, time of travel.....	5 minutes
Elevator load.....	35 persons
Weight of car empty.....	5,670 pounds
Weight of car loaded, 35 persons (1 person equals 150 pounds).....	10,920 pounds
Weight of counterweight.....	8,040 pounds
Cables.....	1½ inches diameter
Dynamo.....	50 kilowatts, 250 volts
Engine, double worm.	
Speed of elevator, 100 feet per minute.	
Engine governor throws off current at 105 feet per minute.	
Car safety stops car at 150 feet speed per minute.	
Elevator tested at 6 tons.	

IMPROVEMENT OF PUBLIC RESERVATIONS IN THE DISTRICT OF COLUMBIA.

The work of the Office of Public Buildings and Grounds is divided as follows:

1. Clerical department.
2. Horticultural department.
3. Engineering department.
4. Police department.
5. Executive Mansion, greenhouses, and grounds.
6. Washington Monument.
7. Departmental telegraph.

For the purposes of administration, all the parks under this office are divided into three divisions, viz:

East division: All east of North and South Capitol streets.

Northwest division: All west of North Capitol street and north of B street north.

Southwest division: All west of North and South Capitol streets and south of B street north.

The area covered by the park spaces of the District of Columbia under the charge of this Office is 469.319 acres.

There are in all 305 reservations, varying in size from 250 square feet to 82 acres.

The 305 reservations are classified as follows:

	Number.	Acres.
Highly improved .....	108	361.698
Partially improved .....	112	22.763
Unimproved .....	85	84.858
Total.....	305	469.319

During the year over one-half of the remaining area of one of the highly improved reservations and one of the improved triangular reservations were separated from the park system under this Office, the first named by transfer to the Superintendent of the Capitol Building and Grounds, the second by transfer to the Commissioners of the District of Columbia. Four park spaces were added to the system by



transfer to this Office from the Commissioners of the District of Columbia, all as shown on the lists given below:

RESERVATION TRANSFERRED TO THE SUPERINTENDENT OF THE UNITED STATES CAPITOL BUILDING AND GROUNDS IN ACCORDANCE WITH THE TERMS OF SUNDRY CIVIL ACT OF APRIL 28, 1904, AS THE SITE FOR THE ERECTION OF A POWER HOUSE TO SUPPLY HEAT, LIGHT, AND POWER TO THE CAPITOL BUILDING, CONGRESSIONAL LIBRARY BUILDING, AND THE PROPOSED CONGRESSIONAL OFFICE BUILDINGS.

*Garfield Park (reservation 17).*

	Square feet.
That part lying between New Jersey and Virginia avenues, South Capitol and E streets SE, containing .....	289, 196
Total area, 6.639 acres.	

RESERVATION TRANSFERRED TO THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA AS A SITE FOR A MUNICIPAL FIRE-ENGINE HOUSE IN ACCORDANCE WITH A PROVISION IN THE DISTRICT OF COLUMBIA APPROPRIATION ACT APPROVED APRIL 27, 1904.

	Square feet.
July 15, 1904: Reservation 125, triangle at intersection of Virginia avenue and K street, between Ninth and Tenth SE.....	18, 054
Total area, 0.414 acre.	

RESERVATIONS TRANSFERRED BY THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA TO THE OFFICE OF PUBLIC BUILDINGS AND GROUNDS.

[Under authority granted by section 2, paragraph (b), of the act of Congress approved July 1, 1898.]

	Square feet.
September 1, 1904: Reservation 143A, triangle at intersection of New Hampshire avenue, Eighteenth, and Q streets NW., containing .....	1, 773. 86
September 1, 1904: Reservation 143B, triangle at intersection of New Hampshire avenue, Eighteenth, and Corcoran streets NW., containing .....	737. 48
January 26, 1905: Reservation 277C, triangle at intersection of North Capitol street and Lincoln road, between Quincy place and R street NW., containing .....	2, 377
April 27, 1905: Reservation 177A, triangle at intersection of New York avenue, Fifth, and L streets NW., containing.....	1, 770. 59
Total area, 0.153 acre.	

Between July 1, 1904, and June 30, 1905, part of the \$25,000 appropriated by Congress for "improving various reservations" was devoted to improving seven reservations hitherto unimproved, containing 0.403 acre, and in placing additional improvements in one other, containing 0.325 acre. These improvements consisted, in a general way, of grading, sodding and seeding, introducing water pipe, in four cases inclosing with iron posts and chain fence, and in one case constructing a cement coping. In addition, one reservation containing 0.079 acre, which was a gravel bank about 10 feet above the surrounding streets, was cut down to grade, the material excavated being used to repair gravel roads and walks in other reservations. The reservations referred to are shown in the accompanying table, which also shows the reservations improved in the six preceding years.

Reservations improved during the fiscal years given.

1897-98.				1898-99.				1899-1900.			
Unimproved.		Previously partially improved.		Unimproved.		Previously partially improved.		Unimproved.		Previously partially improved.	
No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
85	0.173	29	0.329	61	0.050			19	8.020	61	0.050
207	.073	31	.338	140	.160			47	.025	154	.273
211	.105	198	.215					77	.853	163	.176
		194	.181					98	.198		
								99	.112		
								100	.141		
								102	.097		
								122	.865		
								123	.394		
								125	.414		
								126	2.102		
								134	.216		
								163	.176		
								187	.092		
								195	.288		
								206	.111		
								208	.085		
								210	.249		
								211	.105		
								212	.094		
								213	.076		
3	.351	4	1.013	2	.210			21	8.713	3	.499

1900-1901.				1901-2.				1902-3.	
Unimproved.		Previously partially improved.		Unimproved.		Previously partially improved.		Unimproved.	
No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
78	0.108	57	0.065	73	0.014	78	0.108	155	0.004
79	.027	62	.220	81	.093			255	.015
124	.224	64	.315	82	.102			275	.002
159	.152	188	.085	112	.199				
160	.058	206	.111	138	.051				
165	.056			143	.022				
168	.072			146	.126				
190	.148			147	.087				
191	.131			148	.094				
192	.196			177	.012				
201	.507			178	.164				
209	.103			182	.108				
230	.375			183	.108				
251	.250			184	.174				
259	.124			196	.118				
260	.088			229	.224				
266	.131			276	.020				
267	.145			277	.017				
271	.015			285	.241				
277	.259								
20	3.169	5	.886	19	1.974	1	.108	3	.021

1903-4.				1904-5.			
Unimproved.		Previously partially improved.		Unimproved.		Previously partially improved.	
No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
189	0.052	37A	1.657	143A	0.040	309	0.325
269A	.018	37B		143B	.017		
		38A		177A	.040		
		41A		186	.166		
		41B		262	.047		
		44A	.193	263	.040		
		65A		277C	.053		
		188A		300	.079		
		189A	.785				
		277B	.020				
2	.070	10	2.655	8	.482	1	.325



In addition to the foregoing, the unimproved portion of Monument grounds annex which lies west and south of the propagating gardens and the portion between the Seventeenth street roadway and the bathing beach, an area of about 23 acres, was brought to a high state of improvement by grading, soiling, seeding, sodding, planting, construction of bridle paths, and the macadamizing of the Fifteenth street roadway connection between the river road in Potomac Park and the roadway in Monument Park, northeast of the gardens, this work being done under the special appropriation of \$20,000 provided by Congress for the purpose.

In connection with the subject of the United States public reservations in the city of Washington, it is considered proper to invite attention to the desirability of correcting a typographical error which appears in one portion of the act of Congress approved July 1, 1898 (vol. 30, Stats., p. 570).

The act refers to the use of parking spaces by the private owner of adjacent lands, and the error is explained in detail on page 3917 of the Annual Report of the Chief of Engineers for 1904.

*Park curbing.*—Substantial and gratifying progress has been made during the year in constructing cement copings, with corner posts of similar materials, at the entrances to park walks around reservations. A total length of 6,255 feet of coping and 54 corner posts were built during the year, the work being done under contract. The parks thus inclosed are enumerated in the following table:

Table showing the extent of artificial stone coping constructed as borders around United States public reservations during the fiscal year ending June 30, 1905.

Park.	Length.	Number of corner posts.
	<i>Feet.</i>	
Franklin Park .....	1,851	16
Lincoln Park .....	2,839	26
Folger Park .....	1,151	12
Reservation 59, Massachusetts avenue, Twentieth and P streets, NW .....	392	.....
Reservation 809, Grant street, Seventeenth street and old Sixteenth street .....	522	.....
Total .....	6,255	54

*Park watchmen.*—I especially desire to invite attention to the force of park watchmen, which force is improperly named, inadequate in point of numbers, and insufficiently paid. The designation of watchmen does not describe the members of this force and their duties. They are strictly policemen, with all the powers of the regular police force, and their duty is to maintain proper police control over the parks.

The force is inadequate in point of numbers, and it is urged that an additional sergeant and eleven men be added to it. The compensation of the watchmen is also not commensurate with the duties they perform, and it is earnestly recommended that the following schedule of pay be adopted for the force:

First sergeant in charge, per annum .....	\$1,000
Second sergeant, per annum .....	900
Men, per annum .....	840

The necessity for an increase in the force and in the rate of salary paid them is fully explained on page 3920 of the Annual Report of the Chief of Engineers for 1904.

It is also recommended that the necessary legislation be adopted providing that all fines and forfeitures of collateral from cases brought before the police court by United States park police shall be held and reserved for the benefit of the United States park police under rules similar to those now in force for the Metropolitan police of the city.

The following table shows that in the parks for which watchmen are provided there were 285 arrests made during the year and that the fines imposed and collateral forfeited in those cases amounted to \$1,500; that in addition to the arrests made 1,421 drunken people and 508 persons of objectionable character were ejected from the parks. There is no doubt that many more arrests and ejections were necessary and would have been made had there been park policemen available to enforce the park regulations.

Month.	Nature of offense.										
	Disorderly conduct.	Cases of drunkenness.	Indecent exposure.	Fast driving.	Vagrancy.	Violating bicycle regulations.	Trespass.	Fast automobiles.	Indecent assault.	Assaults and affrays.	Throwing missiles.
<b>1904.</b>											
July.....	9	1	4	5	1	1	3	1	1		1
August.....	18	3	2	3	1		1			1	
September.....	12	2	6		2						
October.....	14	1	1		1	1	5			2	
November.....	3	4	2		2		3			2	
December.....	5	3	1				2				
<b>1905.</b>											
January.....	1										3
February.....		1	3		1						
March.....	5	5					4	1			1
April.....	12	5	1	1	8		2				
May.....	18	2	6		5		8				
June.....	19	2	4	1	5	4	4	2		1	
<b>Total.....</b>	<b>116</b>	<b>29</b>	<b>30</b>	<b>10</b>	<b>26</b>	<b>6</b>	<b>32</b>	<b>4</b>	<b>1</b>	<b>6</b>	<b>4</b>

Month.	Nature of offense.										
	Insane.	Peddling.	Assaults on officers.	Larceny from the person.	Cruelty to animals.	Concealed weapons.	Escaping prisoners.	Escaped from industrial school.	Total number of arrests.	Drunken people ejected from parks and reservations.	Objectionable people ejected from parks.
<b>1904.</b>											
July.....	1								28	150	50
August.....			1						30	81	26
September.....									22	216	69
October.....				1	1				27	139	38
November.....						1	1		18	103	23
December.....				1					12	57	20
<b>1905.</b>											
January.....					1				5	31	
February.....				1					6	20	
March.....		1							18	60	4
April.....				1					33	50	3
May.....								2	42	218	74
June.....			1	1					44	296	131
<b>Total.....</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>285</b>	<b>1,421</b>	<b>508</b>

Month.	Disposition of cases.												Record of fines.			
	Personal bonds taken.	Sent to workhouse.	Turned over to Metropolitan police.	Drunks released when sober.	Nolle prossed.	Insane.	Returned to industrial school.	Sent to reform school.	Youths taken to parents.	Dismissed.	Forfeited collateral.	Number fined.	Total number of cases disposed of.	Total amount of collateral forfeited.	Total amount of fines collected.	Total amount of fines collected and of collateral forfeited.
1904.																
July.....	4	1		1		1					10	10	28	\$56	\$100	\$156
August.....	8	2		3							14	8	30	81	89	161
September.....	2	2		12							11	5	22	80	55	135
October.....	5	2		1					2		3	14	27	18	105	113
November.....	3	3	2	4							5	1	18	30	20	50
December.....	1			3							5	3	12	25	30	55
1905.																
January.....											4	1	5	11	2	13
February.....				2							2	2	6	15	40	55
March.....				5	1					1	6	5	18	28	35	61
April.....	1	2		3	1		2				17	7	33	146	85	231
May.....	3	6		2				3		1	10	17	42	52	110	162
June.....	5	3		2	1					4	10	19	44	95	208	303
Total.....	27	21	2	29	3	1	2	3	2	6	97	92	285	630	870	1,500

CHILDREN'S PLAYGROUNDS.

Special attention was invited to this subject in my last annual report, page 3922, Report of the Chief of Engineers for 1904, and the recommendations therein made are repeated, namely: That an appropriation of \$3,000 be made for establishing, maintaining, and caring for children's playgrounds on public reservations in Washington. It is also recommended that authority be given to this Office to erect or permit the necessary structures thereon. During the past year the public playgrounds committee have desired to place, at their own expense, temporary wooden structures for shelter and the use of children in their games on some of the reservations that have been set aside as playgrounds. They could not, however, be permitted to do this, as the act approved August 30, 1890, volume 26, Statutes, page 396, prohibits the erection of temporary structures of any kind upon any reservation except when authorized by special act of Congress.

MAINTENANCE OF IMPROVED PARKS.

The usual work required for maintaining the improved parks and park spaces in good condition was extended during the year. This work consisted of mowing and raking lawns, edging their borders, sodding or seeding bare places on them, planting and caring for flower beds, pruning trees and shrubs, trimming hedges and removing dead trees, cleaning gutters and draintraps, and sweeping paved roads and walks. In the autumn of 1904 (October and November) some flower beds were planted with pansy plants and some with flowering bulbs for early spring bloom. In the spring of 1905, 225 beds and 24 vases were planted with 979,374 flowering and foliage plants for summer decoration. These beds were protected in many cases by hooped irons placed around them.

The beauty and neatness of very many of the improved reservations have been marred by unsightly bare places on their lawn surfaces and

by worn borders. The special effort made during the year 1903-4 to eliminate these blemishes by resodding was continued during the present year, and as a result 17,830 square yards of sod have been laid over the places mentioned during the year, vastly improving the appearance of the parks and park places thus treated. In addition to the foregoing the following work was accomplished:

## NORTHWEST DIVISION.

*Du Pont Circle.*—The exterior of the watchman's lodge was painted, 15 of the old park seats were removed for repairs, and 20 repaired seats put in their places. Some of the bare places on lawns were sodded and others seeded, and sod borders were laid around the flower beds; 600 square yards of the asphalt walks were resurfaced.

*Franklin Park.*—A cement coping 1,851 feet in length, with 16 cement corner posts at the entrances to walks, was constructed around this park. The ground back of the coping was graded up with soil, sod borders laid, and grass seed sown over the remaining area; 288 linear feet of brick gutter at the entrances to walks was taken up and the trenches filled up and made part of the gravel walks; repairs were made to 2,530 linear feet of brick gutters and 13 linear feet of new brick gutter were laid. The interior and exterior of the watchman's lodge were painted and a new floor laid. Gravel walks were repaired. Worn places in asphalt walks were repaired, the area resurfaced amounting to 141 square yards.

*Farragut Park.*—The water service on the east and west sides was extended by laying 260 feet of 1½-inch galvanized iron pipe and placing two new hose valves thereon. Worn places in the asphalt walks were repaired over an area of 160 square yards.

*Iowa Circle.*—Four new flower beds were made, 20 park benches placed in the circle, and the asphalt walks repaired, the area resurfaced amounting to 450 square yards.

*Judiciary Park.*—The woodwork of the watchman's lodge was repaired and the interior and exterior of the building painted. Repairs were made to worn places in the asphalt walks, the area resurfaced amounting to 330 square yards. Manure was spread on the lawns on the east side of the park and bone meal on the lawns in other portions. Repairs were made to worn portions of the gravel walks. The iron post-and-chain fence was painted; 1,787 linear feet of cobblestone gutter were relaid and 647 linear feet repaired, and 1,400 linear feet of brick gutter were relaid and 1,411 linear feet repaired. The Belgian blocks and the asphalt blocks of two aprons, each containing about 206 square feet, in front of the coal vaults of the court-house building, were taken up and relaid. One new brick catch basin was built and 54 feet of 6-inch terra-cotta drain pipe laid to carry off surface water, and one new cesspool trap was put in and 8 feet of 4-inch cast-iron pipe laid from it for the same purpose. The recent widening of G street by the District government took a strip 5 feet wide from the north side of the park the whole length from Fourth to Fifth streets, a distance of 568 feet, and required the lowering of the grade of the ground along the pavement on that side for a width of 4½ feet back. This strip was resodded and borders and bare places on the lawns were also resodded. A broken drinking fountain was replaced with a good one.

*Lafayette Park.*—The water service in the southeast part of the park was extended by laying 190 feet of 1½-inch water pipe and placing a hose valve thereon. The close-board fence around the lodge was painted; 2,600 linear feet of brick gutters were repaired. Bone meal was sown over the lawns. The entire surface of the gravel walks was coated over with fresh gravel and rolled, 486 cubic yards of gravel being used for the purpose.

*McPherson Park.*—The water surface on the north, west, and east sides was extended, 197 feet of 1½-inch galvanized iron pipe having been laid, and 3 hose valves placed in position.

*Mount Vernon Park.*—The laying of a cement pavement by the District government on the sidewalk on the north, east, and west sides of the park left strips of bare ground at those corners, which were graded with soil and added to the park area. This new ground was sown with grass seed, a border of sod 2 feet wide laid around the three sides of the park mentioned, and, as there is no fence, a wire fence was put up to protect the new borders. Water pipe for irrigating purposes was introduced on the east and west sides, 58 feet of 1½-inch lead pipe, 236 feet of 2-inch and 290 feet of 1½-inch galvanized-iron pipe having been laid, and 6 hose valves placed in position for the purpose.

*President's Park.*—A cobblestone apron 26 feet by 2 feet was constructed at the entrance to one of the park roads to connect the asphalt street pavement with the gravel road. A new gutter bridge was built on the line of the bridle path. Parts of the lawns damaged by ball playing were resodded. The northwest part of the gravel road around the ellipse was coated with broken trap rock, a base of 2-inch stone being first used, then a middle course of 1-inch stone, and a coating of ½-inch and less, the area covered being 4,446 square yards. An area of 2,268 square yards was covered with trap-rock screenings. One ton of bone meal was sown over the ellipse. The roof of the lodge at Seventeenth and B streets was painted. The triangular piece of ground in the northeast corner of the grounds had a stake-and-wire fence placed around it and a bed planted with tropical plants; 76 feet of terra-cotta drain pipe were laid in the west side of the grounds.

*Sheridan Circle.*—Twenty evergreens were planted and 8 flower beds made and planted.

*Washington Circle.*—The water service was extended by laying 221½ feet of 1½-inch water pipe and placing two hose valves thereon. Bare places on the lawns and broken edges were resodded. Exterior of watchmen's lodge painted, broken glass replaced with new glass. Manure was spread on portions of the lawns. The gravel walks were coated with fresh gravel, 80 cubic yards of gravel having been used for the purpose; 742 feet of brick gutter and 6 drain traps were repaired and 119 feet of new gutter made.

*Reservations 22, 23, 24, 26, 27, 29, 30, 31, 33, 35, 36, 58, 74, 75, 76, 144, 145, 146, 147, 148.*—Bare places on the lawns and the spaces around the trees on the sidewalks were sodded.

*Reservation No. 28, Pennsylvania avenue, Twenty-first and I streets NW.*—The old terra-cotta drain from the fountain was removed and 95 feet of 4-inch cast-iron pipe laid in its place. Bare places on lawns and the spaces around trees on sidewalks were sodded.

*Reservation 59, Massachusetts avenue, Twentieth and P streets NW.*—The post-and-chain fence was removed and a cement coping 392 feet



long constructed around the reservation. The surface of the ground back of the coping was graded with soil and a border of sod laid. The ground around the trees on the sidewalks was also sodded. A short stone-flag walk was laid in front of the lodge. A cement fountain basin was constructed, 35 feet of 4-inch cast-iron waste pipe laid for its service and the water supply changed.

*Reservation 62, Massachusetts avenue and N street, between Sixteenth and Seventeenth streets, NW.*—Two flag-stone walks, 4 by 6 feet, were laid across the sidewalk parking opposite the walks leading to the statue of Daniel Webster. Bare places on lawns and the spaces around trees on sidewalks were sodded.

*Reservation 64, Massachusetts avenue and N street, between Fifteenth and Sixteenth streets, NW.*—Two flag-stone walks, 4 by 6 feet, were laid across the sidewalk parking opposite the walks leading to the statue of Hahnemann. Bare places on lawns and the spaces around trees on sidewalks were sodded.

*Reservation 67, Massachusetts avenue, Fourteenth and M streets, NW.*—Water was introduced by laying 44 feet of pipe.

*Reservations 68 and 69, Massachusetts avenue and L, between Tenth and Twelfth streets, NW.*—Eight hundred and thirty-seven square yards of sod were laid.

*Reservations 70, 71, 72, 73, 74, 75, 76, 77, Massachusetts avenue, between First and Tenth streets, NW.*—The post-and-chain fences inclosing these reservations, a total of 368 posts and 2,767 feet of chain, were painted.

*Reservation 78, Massachusetts avenue and F street west of North Capitol street.*—The post-and-chain fence was taken down in May, as the reservation will be filled and its grade changed by the District government in connection with raising the grade of the surrounding streets under the grade-crossing act.

*Reservation 143A, at New Hampshire avenue, Eighteenth and Q streets, NW.; Reservation 143B, at New Hampshire avenue, Eighteenth and Corcoran streets, NW.*—These reservations were transferred by the Commissioners of the District of Columbia to the Chief of Engineers, United States Army, in August, 1904. During September and October they were graded, covered with soil, sodded, and water introduced, 86 feet of pipe having been laid for the purpose with a hose valve in each.

*Reservation 150A, Connecticut avenue, Eighteenth and N streets NW.*—The small iron fountain basin was removed from this reservation, the mound removed, the ground leveled, and a new flower bed made.

*Reservations 158, 159, 160, 181, 182, 183, 184, 190, 275, 276, and 277.*—The post-and-chain fences inclosing these reservations, a total of 374 posts and 2,999 feet of chain, were painted.

*Reservations 175, 176, 177, and 178, New York avenue, between Third and Tenth streets NW.*—The post-and-chain fences inclosing these reservations, a total of 156 posts and 1,240 feet of chain, were painted.

*Reservation 177A, New York avenue, Fifth and L streets NW.*—This unimproved reservation, which was transferred by the Commissioners of the District of Columbia on April 27, 1905, was graded and sodded in May.

*Reservation 186, Ohio avenue, Thirteenth and C streets NW.*—The ground was smoothed over, uneven places removed, and a post-and-chain fence, consisting of 60 posts and 468 feet of chain, erected and painted.

*Reservation 187, Louisiana avenue, Sixth and C streets NW.*—The iron post-and-chain fence inclosing this reservation, consisting of 45 posts and 366 feet of chain, was painted. Bare places on lawns and spaces around trees on sidewalks were sodded.

*Reservation 191, New Jersey avenue and Third street, between N and O streets NW.*—An iron post-and-chain fence, consisting of 43 posts and 341 feet of chain, was erected around this reservation. The fence was painted.

*Reservation 192, New Jersey avenue and Third street, between M and N streets NW.*—The District government laid a new cement pavement on the sidewalk on the east side of this reservation, lowering the grade 9 inches. The parking on that side was lowered to the grade of the new pavement and sodded. The post-and-chain fence, 61 posts and 481 feet of chain, was painted.

*Reservations 193, 194, 195, and 196, New Jersey avenue, between E and K streets NW.*—The post-and-chain fences inclosing these reservations, a total of 192 posts and 1,345 feet of chain, were painted.

*Reservation 270 A, Florida avenue, Nineteenth and T streets NW.*—Water was introduced into this small reservation by laying 20 feet of pipe and placing a hose valve thereon.

*Reservation 277 B, North Capitol street and Lincoln road, between Q street and Quincy place NE.*—This reservation was regraded, a flower bed made, the borders of the ground and the spaces around the trees on the sidewalk sodded. The post-and-chain fence, consisting of 19 posts and 155 feet of chain, was painted and galvanized-iron water pipe laid.

*Reservation 277 C, North Capitol street and Lincoln road, between Quincy place and R street NE.*—The post-and-chain fence inclosing this reservation, consisting of 26 posts and 206 feet of chain, was painted and water pipe for irrigating purposes laid.

*Reservation 308, Center parking on Quincy street, between Connecticut avenue and Twenty-ninth street NW.*—This parking is about 725 feet long and 25 feet wide. Water was introduced in September, 77 feet of pipe having been laid for the purpose.

*Reservation 309, Grant street, Seventeenth street and old Sixteenth street NW.*—This reservation was regraded, a border of sod laid, grass seed sown, a cement coping, 522 feet in length, laid around it, the spaces around the trees on the sidewalk sodded and water pipe laid.

*Reservation 311, Harewood and Maple avenues (T street) and Third street NW.*—Water was introduced by laying 70 feet of pipe and placing one hose valve thereon.

#### SOUTHWEST DIVISION.

*Henry Park.*—Repairs were made to the main gravel road, park settees restaked and fastened down. Worn places in lawns loosened and grass seed sown, 9 dead trees cut down and removed, and 602 linear feet of old board walk taken up and relaid, new material being used to replace that which was worn out and unserviceable.



*Monument grounds.*—Extensive repairs were made to the gravel roads, 650 cubic yards of gravel having been used for the purpose. Eleven hundred square yards of cinder walks were resurfaced with new cinders. The board walk in the southeastern part of the grounds was moved from the sides to the center of gravel walk and the ground uncovered was sodded. One hundred and forty feet of new board walk were laid. Three brick catch basins were built, 249 linear feet of terra-cotta drainpipe laid, and 224 feet of old terra-cotta pipe that had become choked was abandoned and new pipe laid in its place. Manure was spread on portions of the lawns. An abandoned basin south of the south fish pond was filled up, graded, covered with soil, and seeded. The surface improved covered an area of about 5,023 square yards, and 2,325 cubic yards of clay and 433 cubic yards of soil were used in the improvement.

*Seaton Park.*—The exterior of the watchman's lodge was painted. Worn places on lawns were resodded, loose settees restaked and fastened, and 300 linear feet of stake and wire fencing erected to prevent trespassing. Thirteen dead trees were removed. The gravel roads and walks in the east section of the park and a part of the walks in the west section were repaired, 262 cubic yards of gravel having been used for the purpose. One of the sections of the New Jersey avenue and B street trunk sewer is being constructed through this park by the District Commissioners, and the work in connection therewith will keep the part of the park through which the trench has been cut in an unsettled condition until the sewer is completed and the ground restored.

*Smithsonian grounds.*—Worn places in the asphalt roads and walks were repaired, 357 square yards of roads and 680 square yards of walks having been resurfaced. Two hundred and seventy-two square yards of worn gravel walks were repaired with fresh gravel. A bridle path 4,795 feet long and 18 feet wide was staked out, and 10 wooden bridges built over gutters on line of same. Two tons of bone meal were spread on the lawns. Ten dead trees were removed. The exterior of the lodge was repainted. The gravel was removed from a short walk in the south grounds which is to be abandoned and the excavation filled with soil. The gravel excavated was used in repairing other walks. Catch basins were repaired and 71 linear feet of stone gutters and 322 linear feet of brick gutters were taken up and relaid.

*Reservation 111, Virginia avenue and B street, between Eleventh and Twelfth streets S W.*—Bare places on the lawns were sown with grass seed.

*Reservation 201, Maryland avenue, Third and B streets S W.*—Considerable damage was done by its temporary occupancy by a contractor who was engaged in constructing a public sewer adjoining the reservation. This damage was repaired by this Office by resodding bare places on lawns and replacing the broken shrubbery and plants with new stock. The entire cost of the work was \$80.86, and that amount was paid by the contractor and deposited with the Treasurer of the United States to the credit of the proper appropriation. After the completion of the work of restoration 686 linear feet of stake-and-wire fencing were erected and painted, to prevent trespassing.

*Reservation 215, Delaware avenue, Third and N streets S W.*—This reservation has been set aside as a children's playground. The ground

was cleaned up, iron posts for a post-and-chain fence set up on the Third street and N street sides of the reservation, and water introduced by laying 65 feet of pipe. A hydrant was also erected and 90 feet of 4-inch cast-iron drainpipe laid to carry off waste water.

*Reservation 294, Water, Sixth and N streets S W.*—One hundred and twenty-one feet of pipe were laid for introducing water.

#### EAST DIVISION.

*Folger Park.*—Bare places on the lawns were sown with grass seed and worn borders resodded. In August, 1904, the post-and-chain fence, consisting of 146 iron posts and 1,168 feet of chain, was painted. In April, 1905, this fence was taken down, the brick gutters taken up and hauled to storage, and in May a cement coping 1,145 feet long was constructed around the park, with 12 cement corner posts at the entrance to walks. A cement pavement, covering a total area of 104 square yards, was laid at each of the six entrances to connect the park asphalt walks with the street sidewalks. The low ground back of the new coping was raised, regraded with 370 cartloads of soil, part of it sodded and the remainder sown with grass seed and rolled. Bare places on the lawns were sown with grass seed and worn borders were resodded. The spaces around the trees on the sidewalks were sodded. Worn places in the gravel walks and on the graveled margins of the asphalt walks were repaired.

*Garfield Park.*—The roofs of the lodge house and of the tool and store house were painted. The following materials were removed from along the line of the Pennsylvania Railroad improvements and from the west section of the park between New Jersey and Virginia avenues and South Capitol and E streets and used in work on other reservations: Two hundred and twenty-eight cubic yards of gravel, 119 cartloads of cobblestones from gutters, 527 cartloads of soil, and 155 cartloads of sod from lawns.

This west section, which contains about 6.6 acres, was designated by Congress in sundry civil act approved April 28, 1904, as a site for a building for a power house for the office building of the House of Representatives, the Capitol building, and the Congressional Library building, and was transferred to the Superintendent of the Capitol building, for the purpose indicated by the Chief of Engineers, on June 26, 1905.

The triangle between New Jersey avenue, First, and E streets SE. was supplied with water, 88 feet of pipe having been laid for the purpose. A small lodge house was removed from the park and taken to Stanton Park.

*Lincoln Park.*—Eleven old gas lamps along the boundary line of the park, which had been out of service for some years, were taken down and removed to the storage grounds at the nursery. A cement coping 2,339 feet in length was constructed around the park and 2 cement corner posts constructed at each of the 13 walk entrances. This required the grade of the lawn surface inside of the coping to be raised. On the north, east, and the greater portion of the south side the fill was 12 feet wide and about 6 inches deep, and this was seeded down and a border of sod 1 foot wide laid just inside the coping. On the west side a strip 4 feet wide was graded and sodded. In this work 700 cartloads of clay were used in filling, and the area sodded was 460

square yards. The sod and soil used was removed from the ground before regrading, and the clay filling was hauled in without expense to the United States by persons making excavations for buildings in the vicinity. The exterior of the lodge was painted, 70 cartloads of screened gravel used in repairing gravel walks, and repairs made to worn places in asphalt walks, the area resurfaced amounting to 110 square yards. The spaces around the trees on the sidewalks were sodded.

*Marion Park.*—Twenty-five cartloads of gravel were used in repairing worn places in gravel walks. Bare places on the lawns were seeded and worn borders sodded. In June work was commenced for constructing a cement fountain basin in the center of the park, and by the close of the month was practically completed.

*Stanton Park.*—A small lodge house, removed from Garfield Park, was placed near the southwest corner of the park. The woodwork of this lodge was repaired, interior and exterior painted, and broken glass replaced with new glass. Worn places in the gravel walks were repaired. Fourteen cartloads of screened gravel were used in the work. Bare places on lawns were seeded and worn borders sodded. The ground around the trees on sidewalks was also sodded.

*Reservations 38 to 51, Pennsylvania avenue, from Fourth to Twelfth streets SE.*—The post-and-chain and post-and-bar fences inclosing these 14 reservations, a total of 831 posts, 2,032 feet of chain, and 4,335 feet of bars, were painted. At reservations 38 to 49 the grounds around the trees on the sidewalks were sodded. At reservations 45 to 51 the lawns were fertilized with bone meal. At reservations 39, 48, and 49 the water service was extended, a total of 334 feet of pipe having been laid and a hose valve placed in each of the three reservations.

*Reservations 39, 41, 43, 44, and 48, Pennsylvania avenue, between Fourth and Ninth streets SE.; reservations 82 to 87, Massachusetts avenue, from Second to Tenth streets NE.; reservations 203 to 205, Maryland avenue, First to Third streets NE.; and reservations 230 to 234, North Carolina avenue, from Sixth to Tenth streets SE.*—Bare places on the lawns were seeded and worn borders were resodded (except in reservations 87, 203, 204, and 230), the lawn surfaces fertilized with bone meal, and the spaces around the trees on sidewalks sodded.

*Reservation 83, Massachusetts avenue, Third and B streets NE.*—Fifty-five feet of water pipe were laid and 1 hose valve placed thereon for introducing water into the reservation.

*Reservation 86, Massachusetts avenue and A street, between Eighth and Ninth streets NE.*—The iron post-and-chain fence inclosing this reservation, consisting of 39 posts and 312 feet of chain, was painted.

*Reservation 125, Virginia avenue and K street, between Ninth and Tenth streets SE.*—On July 15, 1904, the Chief of Engineers, United States Army, in pursuance of a provision in the District of Columbia appropriation act approved April 27, 1904, relinquished this reservation to the Commissioners of the District for use as a site for a fire-engine house. In November, 1904, the iron post-and-chain fence inclosing the reservation and the granite marking stones at the corners were removed by employees of this Office and stored for use on other portions of the public grounds.

*Reservation 126, Virginia and Georgia avenues and L street, between Ninth and Eleventh streets SE.*—Portions of the playgrounds were

coated with clay. In August park seats were placed in the grounds, but they were removed the following month as it was found they were monopolized far into the night by noisy people who disturbed the residents of the neighborhood. On March 22, 1905, the Secretary of War granted a revocable license to the Pennsylvania Railroad Company to temporarily store the earth back fill from their new tunnel on Virginia avenue, in connection with the work in progress for the elimination of grade crossings. The license provided that the railroad company should pay the United States a rental for the use of the reservation. On May 10 the license was revoked, at the request of the company (before the ground had been occupied by them), for the reason that changes made in their plans made the use of the grounds unnecessary.

*Reservation 203, Maryland avenue, First and A streets NE.*—The cement coping on the south (A street) side of the reservation was in bad condition and was removed by the District government in November, as it was in the way of a new cement pavement laid by them on the sidewalk on that side. The gravel walk through the reservation was reduced to a width of 5 feet, the borders sodded, and the walk resurfaced with screened gravel.

*Reservation 205, Maryland avenue, Third and B streets NE.*—The old water pipe was abandoned, owing to a leak, and 40 feet of new water pipe laid.

*Reservations 206 to 213, Maryland avenue, from Sixth to Fourteenth streets NE.*—The lawns were fertilized with bone meal.

*Reservation 211, Maryland avenue, Thirteenth and F streets NE.*—The granite curb on the south (F street) side was moved back about 12 inches and a cement pavement laid by the District government on the sidewalk on that side. A border of sod was laid around the edges of the reservation.

*Reservation 251, Georgia avenue, Ninth and M streets SE.*—The fence posts and the surface of the ground were raised to conform to the grade of the sidewalk which had been relaid by the District government. After the grading was completed, which required 243 cartloads of soil, the margins of the reservation were sodded. The water box and standpipe were also raised to the new grade. The post-and-chain fence, consisting of 51 posts and 408 feet of chain, was painted.

*Reservation 255, Georgia avenue, Fifteenth and G streets SE.*—The lawn surface was fertilized with bone meal.

*Reservation 259, Kentucky avenue and Thirteenth, between A and B streets SE.*—The post-and-chain fence, consisting of 39 posts and 297 feet of chain, was painted.

*Reservation 260, Kentucky avenue and Thirteenth street, between B and C streets SE.*—The post-and-chain fence, 22 posts and 157 feet of chain, was painted.

*Reservation 262, Kentucky avenue, Fourteenth and D streets SE.*—This unimproved reservation was brought to proper grade, the margins sodded, grass seed sown, a flower bed made, 46 feet of water pipe laid for introducing water, a post-and-chain fence, consisting of 21 iron posts and 180 feet of chain, erected, and a brick pavement 43 feet long and 5 feet wide laid across the base.

*Reservation 263, Kentucky avenue, Fourteenth and E streets SE.*—This unimproved reservation was graded, the borders and terrace sodded, grass seed sown, a flower bed made, 46 feet of water pipe laid



for introducing water, and 19 iron posts and 155 feet of chain erected for inclosing the reservation.

*Reservations 229 to 334, North Carolina avenue, between First and Tenth streets SE.; reservation 255, Georgia avenue, Fifteenth and G streets SE.; and reservation 266, Tennessee avenue, Thirteenth and B streets NE.*—The post-and-chain fences inclosing these seven reservations, consisting of 248 posts and 1,984 feet of chain, were painted.

*Reservation 277 B, North Capitol street and Lincoln avenue, between Q street and Quincy place NE.*—Forty-one feet of water pipe were laid for introducing water.

*Reservation 300, Fifteenth, L, and Water streets SE.*—This reservation was a gravel bank about 10 feet high. It was cut down to the grade of street and the gravel hauled to other reservations and used in repairing roads and walks.

*Reservation 54 B, center parking on Pennsylvania avenue between Fifteenth and Sixteenth streets SE.*—The East Washington Heights Railway Company laid a single track, 144 feet 8 inches long, and erected 3 poles for trolley wires at this parking, under authority, it is understood, granted by their charter.

#### POTOMAC PARK.

Work for improving the unimproved portion of the part of the park which lies between the Monument grounds and the tidal reservoir, and extends from Seventeenth and B streets NW. to Maryland avenue and Fourteenth street SW., was commenced in July, 1904, and completed in May, 1905, under the appropriation of \$20,000 provided by Congress for completing the improvements.

The unimproved portion was that section lying south and west of the propagating gardens, and between those gardens and the new drive along the east side of the tidal reservoir, including the roadway east of the gardens, and a smaller section on the west side of the Seventeenth street driveway between B street north and the bathing beach. The area of both sections is about 23 acres. The improvements consisted of rough grading, soiling, and seeding lawn surfaces; sodding borders; planting trees, shrubs, and vines; constructing cinder walks and bridle paths; macadamizing, curbing, and guttering the Fifteenth street roadway, and laying drainpipe.

In the first section about 62,000 square yards of lawn surface was graded and soiled, about 11,000 cubic yards of clay and 5,500 cubic yards of soil being used for the purpose.

About 1,700 square yards of sod border were laid; 2,000 square yards of cinder bridle paths and 3,500 square yards of cinder walks constructed; 483 trees, 1,253 shrubs, and 500 vines planted; 375 linear feet of the old iron fence at the southeast corner of the propagating gardens, which separated the gardens from the park at that point, was moved in, which added 1,615 square yards to the park area. The water service was extended by laying 416 feet of 2-inch pipe, 220 feet of 1½-inch pipe, and placing 4 hose valves thereon. The roadway east of the gardens, on the line of Fifteenth street, which connects the south roadway in the Monument grounds with the water drive in Potomac Park, was improved with a macadam pavement 12 inches thick, consisting of a base course of broken limestone 4 to 6 inches in size, a course of 2-inch trap rock, a third course of 1-inch trap rock, and a

top course of trap rock ranging in size from  $\frac{1}{2}$ -inch to dust. The area paved amounted to about 3,360 square yards. About 730 linear feet of curb were set, 1,511 feet of cobblestone gutter  $2\frac{1}{2}$  feet wide and covering an area of 420 square yards laid, 2 catch basins built, and 138 linear feet of terra-cotta drain pipe laid. A cobblestone wagon stand 66 feet long and  $10\frac{1}{2}$  feet wide, covering an area of about 91 square yards, was constructed on the west side of the roadway along the front of the Government storehouse in the propagating gardens. The parking space on the east side of the roadway was graded, soiled, and sown with grass seed over an area of 2,510 square yards.

The smaller section on the west side of the Seventeenth street roadway was rough graded over an area of about 25,760 square yards, with 15,200 cubic yards of clay hauled in without expense to the United States, covered with soil procured from the flats and sown with grass seed. A photograph of this smaller section accompanies this report. A strip of low ground 300 by 250 feet, along B street between Seventeenth and Eighteenth streets NW., was brought to rough grade with 4,000 cubic yards of clay, which was also hauled in without expense to the United States.

The part of Potomac Park improved during the fiscal year 1903-4 received the care necessary for its maintenance. In addition to the care of the lawns, plantings, bridle paths and walks, 807 linear feet of stake-and-wire fencing were erected to prevent trespassing, the iron-pipe fence along the top of the sea wall was painted, a new timber deck placed over the outlet gates between the tidal reservoir and the Washington channel, and 169 tons of trap-rock screenings used in repairing the driveways.

The part of Potomac Park (commonly called the flats) lying between the causeway of the Pennsylvania Railroad bridge, the Virginia channel of the river, and the tidal reservoir, containing an approximate area of 50 acres, was, by authority of the Chief of Engineers, transferred to this Office on November 25, 1903, by the engineer officer in charge of the Potomac River improvements, for nursery purposes. Nothing has been done by this Office toward utilizing the grounds until the present time, as there have been no funds available for the purpose. Congress, in sundry civil act approved March 3, 1905, appropriated the sum of \$65,000 for improving the grounds in accordance with plans prepared in the Office of Public Buildings and Grounds. In June, 1905, the brush was cut down and burned, and preliminary surveys made to obtain levels. About 2,000 cubic yards of clay were hauled in without expense to the United States and used in grading low places. Work for the improvement of the grounds will be commenced on July 1, and it is hoped will be well advanced before the coming of winter.

#### PROPOSED ROADWAY ON NORTH AND WEST SIDES OF TIDAL BASIN.

That portion of Potomac Park on the north side and west side of the tidal reservoir is now in a condition to be improved to a certain extent, and the construction of a roadway there would give the people of the city a way of getting to those sides of the reservoir hitherto not accessible in a pleasant way. It is therefore suggested and recommended that along the north and west sides of the reservoir there be constructed a macadam roadway running from the terminus of the

U. S. LIAISON.

De La Salle.

VIEW OF NEW POTOMAC PARK DRIVEWAY, LOOKING NORTH, SHOWING LOCATION OF PORTRAIT STATUES FROM ST. LOUIS  
WORLD'S FAIR.



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Seventeenth street roadway opposite the bathing beach to the Potomac River entrance to the reservoir. The cost of this proposed roadway, constructed in accordance with plans prepared in this Office, including the improvement of the ground on its borders, will be \$50,000, and the appropriation of that amount is earnestly recommended.

**TREES, SHRUBS, PLANTS, FERTILIZERS, AND SKILLED LABOR FOR THE GROUNDS OF THE LIBRARY OF CONGRESS.**

The work performed this year for the improvement of these grounds, under the appropriation of \$1,000 provided for the purpose, consisted in planting evergreen and deciduous trees and shrubs, and in preparing fertilizer of manure and soil compost and spreading it over a portion of the lawn surfaces.

The total number of trees and shrubs purchased was 406, and the total number planted 449, 43 of the latter being from purchases of the preceding year which had been cared for in the nursery at the propagating gardens. One hundred and fifty cubic yards of manure and soil compost were prepared on the storage grounds at Fifth and K streets southeast, hauled to the Library grounds, and spread over portions of the lawns.

**TREES, SHRUBS, PLANTS, FERTILIZERS, AND SKILLED LABOR FOR THE GROUNDS OF THE CAPITOL.**

The work performed for the improvement of these grounds during the fiscal year ending June 30, 1905, consisted generally in the removal of the plantings and the old surface soil from the beds on the terraces on the north, south, and west fronts of the Capitol, and in refilling those beds with fresh soil and compost, 22 of which were subsequently planted with ornamental evergreen trees and shrubs for winter decorations, and 8 with hyacinths, tulips, and crocus (spring-flowering bulbs), and 28 with pansies for early spring bloom, 58 in all. The spring-flowering pansies and summer and autumn flowering plants used were propagated at the propagating gardens of the public grounds.

In the early summer months following these winter plantings were removed to the propagating gardens and all the beds were replanted with flowering and foliage plants. Eighteen large bronze vases surmounting the balustrades bordering the western entrances to the Capitol were filled with palms, plants, and ornamental trailing vines for additional summer decorations.

Summer-blooming water lilies were placed in the fountain basin below the western terrace and in the basin of the rocky grotto in the northern section of the grounds. In the eastern section of the grounds 150 trees and flowering shrubs were planted for permanent decoration.

There were purchased for these grounds 1,002 small evergreen trees, 2,914 small evergreen shrubs, 919 deciduous shrubs, 18 palms for vases, 400 vines, and 3,700 bulbs. The above evergreen trees and shrubs and bulbs were mainly used in the winter plantings and renewal plantings of the beds on the terraces. A small number, 150, were used in the plantings of the Capitol grounds. The deciduous shrubs were temporarily planted in the nursery, propagating gardens, for subsequent planting in the grounds. The total number of flowering and ornamental foliage plants furnished from the propagating gardens for the spring, summer, and autumn decorative plantings of the Capitol grounds was 14,080.

On account of the exposed position of the beds on the terraces the small evergreen trees and shrubs etc., planted thereon, suffer very materially from the severity of the winter months, and a large percentage of them are rendered unfit for replanting. For this reason annual purchases must be made for this winter gardening. Such trees and shrubs as may not be materially injured are transplanted in the nursery grounds of the Propagating Gardens, and cared for there until again used in the park plantings of the Capitol grounds.

#### CARE OF TREE SPACES ON SIDEWALKS AROUND RESERVATIONS.

Since June, 1904, this Office, at the request of the Engineer Commissioner of the District of Columbia, has cared for the spaces around the trees on the public sidewalks around reservations in connection with the care of the reservations. During the year ending June 30, 1905, the parking spaces along the curbs of the sidewalks around the following reservations were sodded:

Reservations 22, 23, 24, 26, 27, 28, 29, 30, 31, 33, 35, and 36, Pennsylvania avenue between Seventh and Twenty-ninth streets NW.

Reservations 58, 59, 62, and 64, Massachusetts avenue, from Fifteenth to Twenty-first streets NW.

Reservations 74, 75, and 76, Massachusetts avenue from Third to Fifth streets NW.

Reservations 144, 145, 146, 147, and 148, New Hampshire avenue between S and W streets NW.

Reservation 187, Louisiana avenue, Sixth and C streets NW.

Reservation 309, Grant street, Seventeenth street, and old Sixteenth street NW.

Folger Park.

Lincoln Park.

Stanton Park.

Reservations 38 to 49, Pennsylvania avenue from Fourth to Ninth streets SE.

Reservations 82 to 87, Massachusetts avenue from Second to Tenth streets NE.

Reservations 203 to 205, Maryland avenue from First to Third streets NE.

Reservations 230 to 234, North Carolina avenue from Sixth to Tenth streets SE.

#### BAND CONCERTS.

The concerts by the United States Cavalry Band from Fort Myer, Va., and the Engineer Band from Washington Barracks, which, with the approval of the Secretary of War, were commenced in June, 1904, and given on Monday, Tuesday, Thursday, and Friday afternoons, were continued from July 1 to October 31. During July and August the concerts were given from 7.30 to 9 p. m., and from September 1 to October 31, 1904, they began an hour and one-half before sunset and terminated at sunset. The concerts were commenced again by the Engineer Band on June 1, 1905. The Cavalry Band, now at Fort Myer, was unable to play that month, as the regiment had just returned in May from the Philippines and their instruments were in unserviceable condition and the band was not recruited to its full strength. For those reasons, the colonel of the regiment requested that the schedule for that band be postponed to July 17, 1905.

Concerts were given in the following-named parks during the year:

Dupont Circle—July 21, August 1, October 11.

Iowa Circle—July 11, 28; August 2, October 28; June 9.

Franklin Park—July 14, 25; August 8, 22; September 27; October 4, 21; June 30.

Judiciary Park, July 1, 8, 19, August 4, 11, 18, October 7; June 6, 13, 20, 27.

Smithsonian grounds, July 7, 15, 29, August 5, 15, September 30, October 14.

Garfield Park, July 12, 22, August 9, September 23, October 8; June 23.

Lincoln Park, July 5, 18, 26, August 12, October 25; June 2, 16.

There were other concerts scheduled for August and September, but they had to be omitted owing to the absence of both bands attending the Army maneuvers at Manassas, Va. Upon the return of the bands in September, the Engineer Band resumed its concerts, and, with the permission of the commanding officer at the Washington Barracks, continued them during October. The Cavalry Band did not resume its concerts owing to its transfer with the headquarters to another station.

To accommodate the bands, a portable band stand, consisting of trestles and a platform in sections, and camp stools, were provided, and they were hauled to the park the day of the concert and removed therefrom the day following. Lamps were provided at the night concerts so that the musicians could read the music. Ice water was also provided for the comfort of the members of the bands.

In addition to the concerts mentioned above, the usual Wednesday afternoon concerts in the Capitol grounds and the Saturday afternoon concerts in the White House grounds were given by the Marine Band from July 1 to September 30, 1904, and in June, 1905.

#### PROPAGATING GARDENS, INCLUDING GREENHOUSES AND NURSERY.

One of the important and crying needs of the propagating gardens is a central heating plant. This must be quite evident when it is considered that there are at the gardens 30 greenhouses, which are heated by 20 separate and distinct heating plants, consisting each of furnace and boiler, and each requiring to be attended to, fed, and cared for separately. The care of these separate plants requires much more labor than a single central plant doing the same work would, and the consumption of fuel is considerably greater.

In considering the advisability of establishing this central heating plant it is suggested that its scope might well be widened to include heat, steam, and electric power for the White House, the State, War, and Navy Departments building, the Treasury Department building, and the Washington Monument.

It is true that sundry civil appropriation act approved April 28, 1904, provided for the preparation by the superintendent of the Library building of preliminary plans, with estimates of cost, for a building with distributing mains for heat, steam, and electric power for existing and projected Government buildings on the Mall and in the vicinity of the White House, but it is considered that the functions of that building would better be confined to those Government buildings now located and to be located on the portion of the Mall east of Fourteenth street, leaving the large area west of that street and extending northward to the vicinity of the White House to be supplied by a separate plant.

It is therefore recommended that an appropriation of \$5,000 be provided for the preparation, under the direction of the officer in charge of public building and grounds, of preliminary plans and estimates of cost for the location, construction, and equipment of a power house with distributing mains for heat, steam, and electric power for the propagating gardens, the Washington Monument, the White House and the buildings in the vicinity thereof, the said officer to report thereon in full to Congress at its next session following the appropriation.

The various greenhouse structures at the propagating gardens were maintained in good condition during the year. Woodwork was repaired

where needed, broken glass replaced with new glass. Furnaces, boilers, and heating pipes were overhauled, cleaned, and such repairs made as were necessary. Considerable miscellaneous painting was done about the building, the glass roofs of greenhouses reputtied and shaded, additional shelving for plants placed in the houses, repairs made to frames, new staging constructed in some of the houses, and the doors of two of the houses replaced with better doors. A new boiler was put in for house No. 18, and a brick chimney 18 feet high and 32 inches square built for that house. Sixty-six side sashes in house No. 12 were altered into hanging sash for ventilating purposes. The water pipe in house No. 28 was extended. The old guttering and spouting on the office building were replaced with new and the exterior of the building painted.

The two additional greenhouse structures which were commenced in April, 1904, were completed during the early part of the fiscal year, the work being as follows: Sashes were put in, ventilating apparatus put up, 400 feet of 3-inch hot-water pipe introduced and connected to the boiler in one of the adjoining houses.

The roofs, gutters, and down spouts of the shops building and the storehouse building were painted and the gutters and spouts repaired. In the shops building broken glass was replaced with new glass, and some window screens were painted. The ceiling of the room over the boiler in the shops was sheathed with pine. The machinery in the building was painted.

In the grounds the lawns were mown and edged, hedges trimmed, gravel roads raked and rolled, gutters repaired, and the other work required to maintain the grounds in a neat and cleanly condition was extended. Necessary care was given to the stock in the nursery and to the plants in the houses.

Considerable work was done in grading the addition to the grounds, in constructing the roadways planned, and in laying drains. New roads were made leading from the gate entrances at the extreme west front of the grounds south to the road which enters from C street. These roads were bottomed with broken stone and finished with gravel. Some of the existing cinder roads in the north part of the grounds were resurfaced with gravel—an area of 1,516 square yards. A short cinder road covering an area of 233 square yards was constructed, and the road leading in from the C street entrance was graded, broken stone being used for foundation and cinders for surfacing. The area graded amounted to 770 square yards. The large weighing scales formerly in the Fifteenth street roadway at that entrance were removed from there when the roadway was macadamized, and reerected in the nursery grounds. About 4,200 square yards of lawn surface was graded, 3,050 cubic yards of earth, hauled in without expense to the United States, having been used for that purpose; 1,474 square rods of sod were laid, part on the borders of lawns and part in sodding a low earth terrace separating the grounds from Potomac Park; 734 cubic yards of cinders and 168 cubic yards of gravel were used in constructing roads. Two pieces of parking near the storehouse and shops buildings, covering an area of 554 square yards, were graded with soil and sown with grass seed. Two of the main lines of drains were constructed, two lines of 18-inch terra-cotta pipe, each 345 feet long, having been laid for the purpose. In addition to those lines 731 feet of 6-inch terra-cotta pipe, 299 feet of 8-inch, and 238 feet of 12-inch pipe were laid, 2,118 linear

feet of brick gutters 20 inches wide constructed, and 13 brick drain traps built and connected with drains. A hedge of 965 privet plants was planted on the west boundary line of the grounds to separate them from Potomac Park. The store yard, just inside the boundary fence at the south end of the propagating-gardens grounds, was cleaned up and the old and useless lumber thrown out. The water supply in the grounds was extended by laying 20 feet of 1½-inch galvanized-iron pipe.

This Office is frequently in receipt of requests for the loan of plants from the gardens for the use of churches, fairs, festivals, etc., and requests are often made for flowering and decorative plants for private purposes.

All such requests have to be declined, as either the loan or gift of any plants would be in violation of the following extract from the act of Congress approved June 30, 1878:

*Provided, That hereafter only such trees, shrubs, and plants shall be propagated at the greenhouses and nursery as are suitable for planting in the public reservations, to which purposes only the said productions of the greenhouses and nursery shall be applied.*

In addition to the plants (over 1,000,000) propagated at these gardens for the reservations under the charge of this Office, there were also propagated over 38,000 plants for other departments of the Government. After those were supplied the surplus remaining, about 13,000, were distributed to hospitals, Government offices, and to whoever asked for them. Appended hereto is a list showing the stock grown, purchased, planted in the parks, and distributed during the year:

*List of stock propagated, purchased, and distributed.*

	Number.	Kinds.	Number of varieties.
PROPAGATED.			
Plants for stock and park planting.....	949,874	45	120
Plants for greenhouses and nursery and fall planting.....	77,846	22	179
Plants for grounds of Treasury Department.....	16,025	15	20
Plants for grounds of State, War, and Navy Department.....	3,150	7	11
Plants for grounds of United States Capitol.....	14,060	(a)	(a)
Plants for Bureau of Engraving and Printing.....	1,208	(a)	(a)
Plants for Washington Aqueduct.....	228	(a)	(a)
Plants for United States Fish Commission.....	300	(a)	(a)
Plants for United States Naval Hospital.....	500	(a)	(a)
Plants for Government Printing Office.....	500	(a)	(a)
Plants for Fort Myer.....	500	(a)	(a)
Plants for Washington Barracks.....	600	(a)	(a)
Plants for Census Office.....	1,300	(a)	(a)
Surplus stock distributed as follows:			
Columbia Hospital.....	500	(a)	(a)
Garfield Hospital.....	500	(a)	(a)
Emergency Hospital.....	500	(a)	(a)
Freedmen's Hospital.....	500	(a)	(a)
Spanish Treaty Claims Commission.....	300	(a)	(a)
Mount Vernon.....	3,000	(a)	(a)
Little Sisters of the Poor.....	300	(a)	(a)
Public schools.....	2,000	(a)	(a)
General public.....	5,640	(a)	(a)
Total.....	1,078,851		
PURCHASED.			
Hardy flowering bulbs.....	31,000	3	16
Tender flowering bulbs.....	16,000	3	3
Plants.....	1,375	12	17
Trees.....	1,494	19	30
Shrubs.....	2,583	21	35

<sup>a</sup>General stock.



## 2652 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Grown in greenhouses for autumn, winter, and spring bloom:		Planted at propagating gardens—Cont'd.	
Chrysanthemums .....	4,000	Heliotropes .....	500
Carnations .....	7,968	Scabiosas .....	784
Heliotropes .....	1,260	Tuberose .....	1,500
Poinsettias .....	300	Miscellaneous .....	2,175
Roses .....	5,300	Planted in parks:	
Smilax .....	2,000	Trees .....	600
Violets .....	2,000	Shrubs .....	2,500
Primulas .....	600	Planted in parks for spring bloom:	
Stevia .....	1,000	Bulbs .....	31,000
Tropical plants .....	12,000	Pansies .....	26,920
Potted and boxed for winter forcing:		Pansies planted in the Capitol grounds .....	3,080
Roman hyacinths .....	10,000	Sent out to parks in May and June:	
Narcissus .....	3,000	Bedding plants .....	944,374
Lily of the valley .....	3,000	Tropical plants .....	5,000
Planted at propagating gardens:		Vases stocked:	
Asters .....	2,853	Number .....	29
Antirrhinums .....	2,086	Plants .....	1,400
Cosmos .....	1,600	Fountains stocked:	
Gladolus .....	2,000	Number .....	6
Gaillardias .....	1,000	Plants .....	35

### SHOPS BUILDING, PROPAGATING GARDENS.

Sundry civil appropriation act for the fiscal year ending June 30, 1905, appropriated the sum of \$2,000 for purchase and repair of machinery and tools for shop at nursery. Under this provision the following machinery was purchased and installed in the shops building during the month of June, 1905.

One 24-inch planer belted to one 6½-horsepower electric motor.

One 8-foot swing-frame saw belted to one 3-horsepower electric motor.

One 15-inch forge blower belted to a shaft run by an electric motor already in place.

One lawn mower sharpening machine belted to one three-fourths-horsepower electric motor.

One 1-horsepower electric motor belted to a lathe already in place.

One grooving machine and attachment for tin work.

One wiring machine for tin work.

One double reaming machine for tin work.

One forming machine for tin work.

### RESERVATIONS OCCUPIED BY THE INAUGURAL COMMITTEE, 1905.

Under authority granted by the act of Congress approved January 17, 1905, the Secretary of War, in February, 1905, granted this committee permission to erect the following:

1. A reviewing stand on the sidewalk in front of the White House grounds.
2. A reviewing stand along the south side of Lafayette Park.
3. A reviewing stand on the north side of reservation 32, Pennsylvania avenue, between Thirteen-and-a-half and Fourteenth streets.
4. A reviewing stand on reservation 34, Pennsylvania avenue, Ninth and C streets NW.
5. A reviewing stand on reservation 35, Pennsylvania avenue and Louisiana avenue, between Eighth and Ninth streets NW.
6. A temporary wooden building in Henry Park just west of the Pennsylvania Railroad station and adjacent to B street north.
7. A temporary wooden building at the north side of the Pension building in Judiciary Park for use as a kitchen; also covered ways and approaches on the south and west sides of the building, all in connection with the proposed inaugural ball.

All of the structures above enumerated were erected under the direction of the inaugural committee during the month of February.

In addition to the foregoing a permit was granted for a display of fireworks on the ellipse in the President's Park on the night of March 4, and the necessary temporary frames for the display and tents for the storage of materials were erected.



Certified checks aggregating \$1,600 were deposited with this Office to cover the cost of restoring the reservations to good conditions after the temporary structures were removed.

A permit was also given to place a searchlight on the top floor of the Monument.

Work was commenced March 6, under the direction of the committee, removing the structures, and by March 15 they were all down and the materials removed.

The grounds were cleaned up and the damages repaired by this Office, the cost being as follows:

Lafayette Park: Cleaning up and rolling sod .....	\$6
Reservation 32: Cleaning up and repairing breaks in asphalt walks .....	3
Reservation 34: Resodding borders and cleaning up grounds .....	5
Reservation 35: Resodding borders and cleaning up grounds .....	5
Judiciary Park: Filling up holes in lawns, and seeding, resodding borders, and repairing asphalt walks .....	100
President's Park: Restoring lawns injured by pyrotechnic display .....	50

The cost of the above work, viz, \$169, was paid by the committee or contractors under them, deposited by this Office in the Treasury and the guaranty checks returned to the depositors.

#### HISTORIC STATUES PRESENTED BY INAUGURAL COMMITTEE.

Among the decorations in the "court of history," on Pennsylvania avenue, Fifteenth to Seventeenth streets, were portrait statues, symbolic female figures, and large vases, which were presented by the executive committee of the Louisiana Purchase Exposition at St. Louis upon the request of this Office for use, first in the inaugural ceremonies and later in the public grounds of this city.

After the court of history was dismantled the following described statues, etc., were turned over to this Office by Mr. Frederic D. Owen, chairman of the committee on street decoration for the inaugural ceremonies, and placed in the parks indicated:

##### *Placed in President's Park.*

Female figure: "Genius of Architecture" ... } Bruno L. Zimon, New York, sculptor;  
 Female figure: "Genius of Music" ..... } from palace of manufactures.  
 Two female figures: "Victory." Michel Tonetti, New York, sculptor; from portico of palace of manufactures.

##### *Placed in Potomac Park, Monument grounds annex.*

Female figure: "Genius of Sculptor's Art" ... } Chas. Harvey, New York, sculptor;  
 Female figure: "Genius of Ceramic Art" ... } from liberal arts building.  
 Female figure: "Transportation by Sea" .... } Antonio C. Spodik, sculptor; from  
 Female figure: "Transportation by Land" ... } portico palace of manufactures.  
 Portrait statue: Andrew Jackson, hero of battle of New Orleans, January 8, 1815. L. Potter, sculptor.  
 Portrait statue: P. De Narvaez, Spanish explorer, 1470-1528. Adams, sculptor.  
 Portrait statue: F. B. Marbois, negotiated sale of Louisiana, 1803. H. Herring, sculptor.  
 Portrait statue: R. R. Livingstone, negotiated purchase of Louisiana, 1803. A. Lukeman, sculptor.  
 Portrait statue: Anthony Wayne, commander in chief of Federal Army, 1792. J. Noble, sculptor.  
 Portrait statue: J. B. Le Moyne Bienville, governor of Louisiana, 1701-1718. Charles Lopez, sculptor.  
 Portrait statue: George Rogers Clark, patriot soldier; saved Mississippi frontier to United States. Elise Ward, sculptor.  
 Portrait statue: De La Salle, explorer, Mississippi Valley, 1681-82. L. Gudsproit, sculptor.

Six vases were also received from the committee.

A photograph of one of the figures representing "Victory" and a photograph of one of the vases accompany this report.

#### AMERICAN RAILWAY APPLIANCE EXHIBITION, MONUMENT GROUNDS.

On February 14, 1905, the Secretary of War, under authority given him by the act approved January 12, 1905, volume 33, Part I, Statutes, page 1275, granted a permit to the general committee of arrangements of the above exhibition to be given in connection with the meeting of the International Railway Congress for the use of the unimproved portion of the Monument grounds fronting about 1,240 feet on B street north, with a depth of 250 feet on the Fourteenth street side and a depth of 600 feet on the Sixteenth street roadway side, the occupancy to continue from March 20 to May 25. The committee entered into the grounds on March 20, first having deposited in this Office, on March 14, a certified check for \$500 to insure the restoration of the grounds after they were vacated by them. Ninety buildings and structures were erected on the grounds for the purposes of the exhibition, which was formally opened on May 3. The exhibition closed on May 12 and the work of dismantling commenced the next day. The buildings were entirely removed and the grounds vacated by the night of May 24, one day in advance of the date mentioned in the act of Congress granting the use of the grounds. Work was at once commenced for their restoration by a force employed under the orders of the director of the exhibition, and by the 3d of June was entirely completed. The entire cost of the work, which amounted to \$506.31, was defrayed by the committee of arrangements of the exhibition, and their deposit check was returned to them on June 6, 1905. The work of restoration was done in a prompt and most satisfactory manner. In fact, the grounds were left in a somewhat better condition than before their occupancy by the committee.

#### OCCUPATION OF RESERVATION 113 BY THE PENNSYLVANIA RAILROAD COMPANY.

On December 15, 1904, the Secretary of War granted a permit to the Pennsylvania Railroad Company to lay four sidetracks into reservation 113, at the intersection of Virginia and Maryland avenues and C street, between Seventh and Ninth streets SW., to furnish accommodation for the delivery of building material and other freight intended for use in the construction of the new buildings for the Department of Agriculture, the National Museum, and the municipal buildings of the District of Columbia. On April 13, 1905, the company commenced to lay the tracks, and on May 29 commenced to unload stone. They also erected a tight board fence around the north and part of the east and west sides of the reservation.

#### STATUES.

There are now 24 statues in the public grounds under the charge of this Office and 7 in contemplation.

Lists of all these statues were printed in the annual reports of this Office for 1903 and 1904.

**STATUE REPRESENTING "VICTORY," SOUTH ENTRANCE TO WHITE LOT ELLIPSE.**

**Michel Tonnetti, sculptor. From St. Louis World's Fair.**



ANTIQUE DECORATIVE URN FROM ST. LOUIS WORLD'S FAIR. ENTRANCE PROPAGATING  
GARDENS, LOOKING SOUTHWEST.







"SHERMAN PLAZA." SHOWING LANDSCAPE GARDENING TREATMENT. VIEW FROM TREASURY STEPS, LOOKING SOUTH.

## SHERMAN PLAZA.

These grounds are in the northeast corner of the President's Park (White Lot), immediately south of the Treasury Department building, and contain the statue of Gen. William T. Sherman, which was completed and unveiled in October, 1903. The grading of the grounds was completed in July, 1904, and work immediately commenced for laying concrete walks. The walk on the south and west sides of the plaza outside of the retaining wall and coping was completed in that month. It covers an area of 740 square yards. During the same month the excavation for the interior walks was completed, the curbing of the outside walk on the west side was reset for a length of 78 feet, 42 square yards of stone gutter relaid, 103 linear feet of the granite coping on the boundary line of the plaza reset, and the circular pieces of coping for the entrances to walks were set in position.

In August the cement walks and coping in the interior were constructed and a cement gutter laid on the inner side of the wall on the south and east sides of the ground. Area of the 8-foot walks, 1,389 square yards; length of 4-inch coping, 2,481 feet; length of 12-inch gutter, 700 feet. Immediately upon completion of the walks, etc., work for finishing the grading of the lawn surfaces was commenced, and completed in September. Sod borders were laid along the coping of the walks and the coping inclosing the grounds. The remaining surface was seeded. Shrubs were planted and honeysuckle vines planted back of the wall on the south and east sides. Four flower beds were laid out, one at either side of the statue. These beds were planted in the autumn with spring-flowering bulbs. In the spring the bulbs were removed and the beds replanted with summer foliage plants in designs representing the corps badges of the Army of the Tennessee. The parking along the edges of the sidewalk on the north side of the grounds was sodded. The letters of the lower inscriptions on the north and south sides of the pedestal of the statue were recolored where necessary. In the triangular piece of parking west of the plaza, a bed of tropical plants was planted in the center, a palm plant set at each corner, and the ground inclosed with a stake-and-wire fence.

In the general deficiency act approved March 3, 1905, Congress appropriated the sum of \$700 for the preparation, etc., of the document entitled "Sherman; a Memorial in Art, Oratory, and Literature, etc.," to be expended by the engineer in charge of public buildings and grounds. This amount was paid to the author of the work on March 31, 1905.

"Sherman Plaza" is now in a high state of improvement, which must be maintained. To do this will require a special appropriation, as the amount provided for the care and maintenance of the President's Park—viz, \$4,000 for about 52 acres—is hardly sufficient for that purpose, and nothing can be spared from it for the care of the Sherman Plaza. It is estimated that the services of two park laborers will be required continuously from March 1 to October 31 for maintaining the plaza in its present condition, and it is recommended that an appropriation of \$600 be made to provide for its maintenance.

A photograph of the plaza as finished accompanies this report.

MEMORIAL TO GEN. ULYSSES S. GRANT.

It is understood that the sculptor and architect of this memorial are engaged upon the models and plans under the contract entered into by them with the Commission on August 10, 1903, for the erection of the work.

STATUE OF GENERAL M'CLELLAN.

In February, 1905, the Statue Commission approved the model of the statue as submitted by the sculptor, and on March 13 the latter was paid the first and second payments due him under the terms of the contract for completing the model.

STATUE OF GEN. PHILIP H. SHERIDAN.

The sculptor who is engaged in making the models for this statue reports that he has arrived at a very satisfactory point with the work and has commenced the enlargement of the figure of Sheridan to its full size, and expects to have it completed in about three months. In the meantime he will have completed the life-size study of the horse, so that it will be ready for enlargement by the time the figure is finished. He also states that when the full-size horse and rider are completed they will be put together for a final retouching, and will then be ready for inspection.

MONUMENT TO GEN. HUGH MERCER.

On July 14, 1904, Mr. Edward V. Valentine was paid the sum agreed upon for submitting a design for the statue and a plan for the pedestal, which were approved by the Secretary of War on April 8 and June 2, 1904, respectively. On January 3, 1905, Mr. Valentine entered into a formal contract for the construction and erection of the monument at Fredericksburg, Va. On May 4 the Secretary of War approved the full-size (10-foot) clay model of the statue made by Mr. Valentine, and on May 13 the latter was made the first payment under his contract, due upon the approval of the model. It is expected that the monument will be erected and completed by October, 1905, although the contract does not require its completion until a year later. The site for the monument is to be furnished by the city of Fredericksburg, and will be conveyed to the United States by the Mercer monument committee of that city.

MONUMENT TO GENERAL COUNT PULASKI.

A model was submitted in March, 1905, by the Polish-American sculptor, who was selected by the Statue Commission to prepare models and designs for the statue. The model was not satisfactory to the Commission and was rejected, and the artist was paid on April 25 the sum agreed upon as a compensation for his services. It is the purpose of the Commission to secure new designs and models by competition.

STATUE OF GENERAL BARON VON STEUBEN.

The Statue Commission have invited certain selected artists of German-American birth who are citizens of the United States to submit models for the statue between October 1 and November 1, 1905.

## STATUE OF GEN. THADDEUS KOSCIUSZKO.

The joint resolution of Congress approved April 18, 1904, accepts the offer of the Polish-American organizations and of the Polish-American people of the United States, generally, to present a statue of General Kosciuszko, to be erected in either the northeast corner or northwest corner of Lafayette Park.

## STATUE OF THOMAS JEFFERSON.

Sundry civil act approved April 28, 1904, creates a commission composed of the Secretary of State, the chairman of the Committee on the Library of the Senate, and the chairman of the Committee on the Library of the House of Representatives of the Fifty-eighth Congress, to select a site on the public grounds of the District of Columbia for a statue of Thomas Jefferson, and appropriates the sum of \$5,000 to procure plans for the same. At the request of the Secretary of State, the officer in charge of this Office will act as executive and disbursing officer of the Commission.

## SETTEES, TOOLS, MANURE, CONSTRUCTION AND REPAIR OF POST-AND-CHAIN FENCES, AND REMOVING SNOW AND ICE.

During the year 191 park settees were repaired and 1,829 painted. All settees in the parks were examined, and those found loose were refastened to the ground with stakes and wire.

Repairs were made to lawn mowers, wheelbarrows, and miscellaneous tools, edge tools sharpened and kept in good order, and new tools purchased from time to time as required.

About 870 cubic yards of well-rotted stable manure were hauled from the compost grounds and spread on park lawns during the winter months. In the spring this material was raked in and the refuse removed.

Repairs were made to iron post-and-chain fences as required. The post-and-chain fences around Folger Park and reservation 59 were taken down and replaced with cement copings. The post-and-chain fence around reservation 125 was taken down and the reservation transferred to the Commissioners of the District, and the post-and-chain fence around reservation 78 was also removed, as the reservation will be filled up by the Commissioners to make it conform to the new grade of the surrounding streets which are to be raised in connection with the abolition of grade railway crossings. Iron posts were set on two sides of reservation 211, which is used as a playground. Four of the small triangular reservations hitherto unclosed were inclosed with post-and-chain fences, 143 posts and 1,144 feet of chain having been erected for the purpose.

The snow and ice were removed as soon as possible after storms from the walks around and through the various parks and park places. Where, through freezing, the snow could not readily be removed, sand was sprinkled and the slush and dirt removed as soon as a thaw set in. There were in all thirteen falls of snow and sleet during the period from November to March 1. The special allotment for removing snow and ice was exhausted early in January, and it became necessary thereafter to use funds from a general appropriation which, while applicable to the purpose, were yet needed for other objects. An esti-

mate for additional funds on this account was submitted to Congress and in general deficiency bill approved March 3, 1905, the sum of \$2,000 was provided to reimburse the general appropriation mentioned on account of the increased expenditures made from it for removing snow and ice. The increased expenditures amounted to \$1,304.81, leaving of the additional appropriation of \$2,000 a balance of \$695.19 to be returned to the Treasury. The total expenditures during the season on account of the removal of snow and ice was \$2,504.81.

#### PAINTING WATCHMAN'S LODGES AND IRON FENCES.

Eight of the lodges were painted. The post-and-chain fences inclosing Folger Park and 47 of the small reservations, a total of 2,131 posts and 16,395 feet of chain, and the post-and-bar fences around 11 of the small reservations, consisting of 694 posts and 5,239 feet of bars, were painted.

#### WATER PIPES AND FOUNTAINS.

Repairs have been made to water pipes and valves from time to time where necessary, and new valves put on. In the autumn the water was shut off from the various parks, the hose valves removed, stored in the shops at the nursery, and repaired and repacked during the winter. In the spring the valves were replaced in the parks. During the year additional pipe was laid in the White House grounds, Farragut Park, Lafayette Park, McPherson Park, Washington Circle, Potomac Park, and reservation 17 (Garfield Park), and pipe was run into Mount Vernon Park and into 23 reservations hitherto not supplied with irrigating facilities. The total quantity of pipe laid for irrigating purposes was 636 feet of 1-inch lead pipe, 58 feet of 1½-inch lead pipe, 2,492 feet of 1½-inch galvanized-iron pipe, 220 feet of 1¼-inch galvanized-iron pipe, and 1,452 feet of 2-inch galvanized-iron pipe. In addition to the foregoing, 166 feet of 3-inch and 432 feet of 4-inch cast-iron pipe were run to supply a fountain. There was also laid drain pipe as follows: 2,510 feet for surface drainage, 470 feet for draining fountains, and 90 feet to drain a hydrant. Fourteen brick drain traps were built. The total length of pipe laid for all purposes was 8,526 feet.

Park closets were policed and repairs made to their plumbing as required.

There are 26 fountains with basins in charge of this Office. One cement fountain was removed during the year and replaced with a flower bed. It was located in reservation 150A at Connecticut avenue, Eighteenth and N streets NW., which has been selected as the site for the equestrian statue of Gen. George B. McClellan. Two additional cement fountain basins were built, one in reservation 59 and one in Marion Park. Repairs were made to the cement basins of these fountains wherever needed, and they were cleaned out, stone copings repointed, stains removed from them, and the supply and waste pipes and valves maintained in order. The jets were removed from the fountains in the autumn, the water turned off, jets requiring it repaired, and all replaced in the spring. Five of the large iron fountains were repainted.

There are 24 drinking fountains in the various parks, and they have been maintained in good order and repairs made when necessary. At the approach of winter the water was shut off and the dippers removed. In the spring the dippers were replaced and the water turned on.

#### LIGHTING THE PUBLIC GROUNDS.

The following parks are lighted with arc electric lights:

	Lights.
Executive Mansion grounds.....	6
President's Park .....	9
Monument Park.....	12
Franklin Park .....	9
Judiciary Park.....	9
Lincoln Park.....	8
Lafayette Park.....	6
Propagating gardens.....	6
Total .....	65

The number of gas lamps in the public grounds not connected with meters lighted nightly during the year was 229 in July, 1903, 221 in August, 222 from September 1, 1904, to June 30, 1905. Twenty-six of these lamps contained the old flat flame burners and 194 contained mantle burners of 60 candlepower. The last named were installed and maintained under contract and the service during the year was very satisfactory.

#### REPAIR OF ASPHALT PAVEMENTS.

The following tabulated statement shows the area of asphalt roadway and foot-walk pavements repaired during the year:

Location.	Repairs to roadways.	Repairs to walks.
	<i>Sq. yards.</i>	<i>Sq. yards.</i>
Du Pont Circle.....		600
Iowa Circle .....		450
Farragut Park .....		160
Franklin Park .....		141
Judiciary Park.....		330
Smithsonian grounds .....	357	680
Stanton Park .....		164
Lincoln Park .....		110
Total.....	357	2,635

#### DEPARTMENTAL TELEGRAPH LINE.

The telegraph lines now under control of this Office are as follows:

The line of overhead wires consists of 82 poles, covering a distance of about 3½ miles, with a length of about 16 miles of wire. This line starts from the Lemon Building, where the main battery is located, and runs to the State, War, and Navy Department building, thence to the Executive Mansion, thence to the Treasury Department, thence to G street, thence to Eighth street, thence to H street, thence to North Capitol street, and thence to the Capitol. Connected with it is one running from the Treasury Department along Fifteenth street to Ohio avenue, thence to Fourteenth and B streets NW. to the Agricultural Department, one down Fifth street to the Pension building, and one from the Treasury Department building up Fifteenth street



to I street, to Fifteen-and-a-half street, to K street near Vermont avenue, connecting with the building temporarily occupied by the offices of the Department of Justice. There is also a short line running on the poles of the Western Union Telegraph Company from Fourteenth and G streets NW. down Fourteenth street to the building occupied by the Department of Commerce and Labor on the east side of Fourteenth street between Pennsylvania avenue and F street, and another short line running on the poles of the same company from Fourteenth and B streets NW. to Twelfth and B streets NW. and thence into the Post-Office Department. There are about 500 feet of 13-conductor cable running from the cable pole in the Capitol grounds into the basement of the Senate, and 250 feet of 20-conductor cable running from the cable pole on the corner of Seventeenth and G streets into the State, War, and Navy building.

During the year the main and local batteries received necessary attention, and were maintained in good working order. All crosses and other obstructions on the wires of the line were removed as soon as possible, instruments maintained in good condition, and necessary repairs made to line wires.

The instruments belonging to the offices in the United States Senate and the House of Representatives, which had been stored during the recess of 1904, were replaced upon the operators' tables in time for the opening of Congress in December of that year and removed therefrom when Congress adjourned in the spring of 1905, and will be carefully stored during the recess.

The wires which ran to the Department of Agriculture were in the way of a new building erected in those grounds and were removed to a suitable distance and all of the old wires not in use taken down. The old cable running through the basement of the Capitol building was found to be defective and unfit for use, and was replaced by a new 10-conductor cable 555 feet in length. Two new cable boxes were placed on the roof of the Treasury Department, and one on the pole on G street, near Fifteenth, and the necessary connections made. Two poles on North Capitol street, between D and E streets, and three poles on same street, between E and F streets, which were in the way of the raising of the grade of the street, and one pole at Seventh and H streets, which was in the way of street improvements, were moved out of the way. One pole at North Capitol and H streets, which had decayed at the surface of the ground and was in danger of breaking, was reset and made safe. The entire line was carefully gone over, and all old and worn-out overhead wires removed and replaced with new copper-conductor weatherproof wire. Forty-five old and decayed 6-pin cross arms were replaced with new arms and all slack in the wires cut out. A snowstorm on November 13 caused considerable damage to the overhead lines by the breaking of wires, etc. This damage was repaired and the wires placed in working order as soon as possible. The operators' table in the Post-Office Department building was moved to another room, about 300 feet of additional inside wire having been run to make the change.

#### OLD LAND RECORDS OF THE CITY OF WASHINGTON.

The act of Congress approved March 3, 1896, authorized and directed the Secretary of War to correct the records of the Department in



respect of certain lots in the city of Washington. The old records referred to are the old land records in this Office, and between the date of the act and June 30, 1905, they have been corrected in the cases of 23 of the lots, as reported in previous annual reports.

#### EXTENSION OF BUILDINGS BEYOND THE BUILDING LINES IN THE CITY OF WASHINGTON.

The act of Congress approved March 3, 1891 (vol. 26, Stat. L., 868), provides that no permits shall hereafter be granted for the extension of buildings beyond the building line, except with the concurrent approval of the Secretary of War.

This Office, by direction of the Secretary of War, is charged with investigation and report on these cases. During the fiscal year ending June 30, 1905, 667 applications for these permits have been referred from the War Department and reported on by this Office.

The extensions mentioned are bay windows, porches, steps, area ways, show windows, etc., and the object of the law quoted was and is to prevent encroachment upon any of the United States public reservations by extensions of the character mentioned to buildings erected on private lots adjoining such reservations. Of the 1,131 building squares in this city, only 125, or about 10 per cent of the entire number, adjoin Government reservations. Nevertheless, under the law, all applications for projections beyond the building line must receive the approval of the Secretary of War, and this entails useless labor upon the Secretary's office and this Office, as well as unnecessary inconvenience and delay to the applicant. The interests of the United States would be just as well protected and much unnecessary labor and delay saved were the law amended so as to require the Secretary's approval only on applications that provide for extensions to buildings that are to be erected on private lots adjacent to public reservations. The Commissioners of the District have in their offices maps showing the locations of all United States reservations in this city, and would send to the War Department only those applications which, under the law as amended, would require the action of the Secretary. Moreover, the United States park police under this Office make regular and frequent inspections of all Government reservations, and would detect and stop any encroachment thereon as soon as commenced. It is recommended that the law be amended as suggested.

#### RESERVATIONS WHICH ARE THE PROPERTY OF THE UNITED STATES OCCUPIED, IT IS BELIEVED, IN VIOLATION OF LAW.

[See map in Annual Report for 1894.]

The following reservations, the property of the United States, are now occupied, it is believed, without authority of law:

Reservation No. 186, by the Bethany Chapel of the New York Avenue Presbyterian Congregation.

Reservation No. 249 is occupied as a lumber yard by a man who claims to rent it from a man in Port Deposit, Md.

Reservations Nos. 137, 138, 152, 164, and 169 have been inclosed with iron or wire fences and partially improved by the owners of adjacent property.

The following also are improved and utilized by adjacent property owners: Nos. 61, 65, 67, 139, 141, 142, 143, 161, 162, 167, 168, 175, 208, and 284.

Reservations 61, 141, 142, above mentioned, are occupied under permits granted the owners of the adjacent property by the Chief of Engineers, under authority of the act of Congress approved July 1, 1898.

In addition to the foregoing there is a valuable piece of United States ground, known as reservation No. 94a, lying between Rock Creek and Twenty-eighth street W., between I and K streets N., of which certain persons are now in unlawful occupation. This Office has for several years been making efforts to secure possession of the property, which have so far proved unsuccessful. This case is reported upon on page 3929 of the annual report of the Chief of Engineers for 1904.

#### MONUMENT AND WHARF AT WAKEFIELD, VA., THE BIRTHPLACE OF WASHINGTON.

In addition to the usual care extended by the United States watchman in charge, he has kept the grass within the iron fence around the monument cut.

As heretofore reported, the wharf was badly damaged in February, 1897, by a violent storm and extensive ice jam. The facts were at once reported to the Chief of Engineers, and an estimate in the sum of \$987 for an appropriation for the necessary repairs submitted. Funds have not been provided, however, and the repairs have not been made.

On February 18, 1905, the ice in the river broke the pierhead completely and seven of the 16-foot bents of the wharf. All of the iron screw piles broke from under the parts mentioned. As there were no funds available for work of any character, the watchman employed men at his own expense to help him secure such of the damaged material as was possible. He succeeded in getting 75 pieces of the broken parts and put them on shore.

The wharf was built by the United States in 1894, at a cost of \$11,000, and was intended as a landing place for steamers carrying visitors to the monument. In its present damaged condition it is useless for that purpose, and the estimates submitted in my last annual report for its repair and for repairing fences and cleaning up and putting the land at the birthplace in good condition are again submitted and recommended, except that the estimate for repairs is increased owing to the additional damage done in February, 1905.

#### UNITED STATES WHARF PROPERTY, WASHINGTON, D. C.

By act of Congress approved March 3, 1899, entitled "An act relative to the control of wharf property and certain public spaces in the District of Columbia," the following-described property is placed under the immediate jurisdiction and control of the Chief of Engineers of the United States Army:

The banks of the Potomac River from the north line of the Arsenal grounds to the southern curb line of N street south. \* \* \*

By letter of March 11, 1899, from the Office of the Chief of Engineers, this Office was directed, as representative of the Chief of Engineers, to assume control of the said wharf line, and since that date it has been in charge of this Office. No work has been done during the year, as there are no funds available for either the improvement or care of the property.

The estimates submitted in last annual report by direction of the War Department for repairing the old sea wall of this wharf property are again submitted.

#### SUMMARY OF WORK DONE DURING THE YEAR.

For convenience of reference a brief summary of the more important items of work accomplished during the year is given as follows:

*Executive Mansion.*—A new mantel of Italian marble placed in the Library Room. Considerable miscellaneous painting and some papering done. New steel cables placed on the elevator. The hard-wood floors cleaned down to the natural wood and refinished. A vacuum cleaning system installed. The northwest bathroom and the southwest bathroom remodeled by the erection of new partitions, cutting new doorways, and the installation of new plumbing fixtures. New conduits and wires run for the service of the electric-light posts on the East Terrace. An inventory of the public property in the Mansion, bought up to date, prepared. Three additional greenhouses and a new hot bed constructed at the propagating gardens as an addition to the Executive Mansion greenhouses now there.

*House where Abraham Lincoln died.*—The front of the building painted.

*House No. 204 L street N W.*—This property, which escheated to the United States, placed under the jurisdiction of the Chief of Engineers in December, 1904. Considerable repairs made to the woodwork and plastering.

*Washington Monument.*—Work commenced in June, painting the ironwork at the top of the Monument. A pair of iron folding gates and a revolving door placed at the entrance. Considerable painting done. New hoisting cables and new counter-weight cables for the electric elevator installed. A new controller cable purchased and connected up for the elevator car. Two new 80-horsepower boilers purchased and installed. A reception room constructed on the lower floor for the accommodation of visitors waiting for the elevator.

*Public grounds.*—One triangular reservation and about one-half the remaining area of one of the improved parks, separated from, and four park spaces added to, the park system under the Chief of Engineers. Eight unimproved reservations partially improved and one partially improved reservation still further improved. Cement coping constructed around five reservations, a total length of 6,255 feet, with 54 corner posts at entrances to walks. Seventeen thousand eight hundred and thirty square yards of sod laid to restore worn portions of lawn surfaces. Extensive repairs made to the main roadway in the President's Park by surfacing with broken trap rock. Two new cement fountain basins constructed. Extensive repairs made to the gravel roads in parks. A bridle path 4,795 feet long and 18 feet wide staked out in the Smithsonian grounds. Eighty-one hundred and sixty-eight feet of stone and brick gutters relaid or repaired. The unimproved portions of Potomac Park between the Monument grounds and the tidal reservoir, and the part on the west side of the Seventeenth street park driveway and extending from B street N W. to the bathing beach improved, the improvements which cover an area of 23 acres, consisting of grading, soiling, and seeding lawn surfaces, sodding borders, planting trees, shrubs, and vines, constructing cinder walks and bridle

paths, macadamizing, curbing and guttering the Fifteenth street roadway, and laying drain pipe. Four hundred and forty-nine trees and shrubs planted in the grounds of the Library of Congress. A large number of trees, shrubs, vines, and bulbs planted in the Capitol grounds. A large amount of sodding done on the spaces around the trees on sidewalks around Government reservations. One hundred and ninety-one park settees repaired and 1,829 painted. About 870 cubic yards of stable manure spread on lawns. Six hundred trees and 2,500 shrubs planted. Four of the small triangular reservations inclosed with park post-and-chain fences, requiring 143 posts and 1,144 feet of chain. Eight park lodges, the post-and-chain fences around 48 reservations, consisting of 2,131 posts and 16,395 feet of chain, and the post-and-bar fences around 11 reservations, consisting of 694 posts and 5,239 feet of bars painted. Five thousand four hundred and fifty-six feet of water pipe, and 3,070 feet of drain pipe laid and fourteen drain traps constructed. Three hundred and fifty-seven square yards of asphalt roadway and 2,635 square yards of asphalt foot walks resurfaced. Improvements and betterments made in the lines of telegraph which connect the Capitol with the Departments. Six hundred and sixty-seven applications for projections beyond the building lines investigated and reported upon.

*Propagating gardens.*—The two additional greenhouse structures commenced in April, 1904, completed. Considerable work done in grading the additions to the grounds of the gardens in constructing the roadways planned for them and in laying drains. Over 1,000,000 plants propagated. Additional machinery and electric motors installed in the shops building.

*Statues.*—The work of improving "Sherman Plaza," the site of the statue of General Sherman, completed by grading, constructing cement walks, planting shrubs, and making flower beds. The model of the statue of General McClellan approved and paid for. A contract entered into for the erection of the monument to General Mercer, at Fredericksburg, Va., the full size clay model of the statue submitted, approved, and paid for. The model for the statue of General Pulaski submitted by the artist who was selected to make it, rejected, and the artist paid for his services.

*Estimates for the fiscal year ending June 30, 1907.*

**Salaries of employees, public buildings and grounds, etc.:**

1 assistant engineer.....	\$2,400
1 clerk, class 4.....	1,800
1 clerk, class 3.....	1,600
1 messenger.....	840
1 landscape gardener.....	2,000
1 surveyor and draftsman.....	1,500
Chief clerk, at \$2,400; <sup>a</sup> clerk and stenographer, at \$1,400, overseers, draftsmen, copyists, foremen, gardeners, me- chanics, and laborers.....	35,000
1 first sergeant of park police, in charge.....	1,000
1 second sergeant of park police.....	900
1 day policeman in Lafayette Park.....	840
1 night policeman in Lafayette Park.....	840
1 day policeman in Franklin Park.....	840
1 night policeman in Franklin Park.....	840
2 day policemen in Smithsonian grounds, at \$840 each...	1,680

<sup>a</sup>Of this amount \$2,000 was authorized in the legislative, executive, and judicial appropriation act for 1906, and \$400 in the sundry civil appropriation act for 1906.

## Salaries of employees, public buildings and grounds, etc.—Continued.

2 night policemen in Smithsonian grounds, at \$840 each...	\$1, 680
1 day policeman in Judiciary Park .....	840
1 night policeman in Judiciary Park.....	840
1 day policeman in Lincoln Park and adjacent reservations .....	840
1 night policeman in Lincoln Park and adjacent reservations .....	840
1 day policeman in Iowa Circle.....	840
1 night policeman in Iowa Circle .....	840
1 day policeman at Thomas Circle and neighboring reservations .....	840
1 night policeman at Thomas Circle and neighboring reservations .....	840
1 day policeman at Washington Circle and neighboring reservations .....	840
1 night policeman at Washington Circle and neighboring reservations .....	840
1 day policeman at Dupont Circle and neighboring reservations .....	840
1 night policeman at Dupont Circle and neighboring reservations .....	840
1 day policeman at McPherson and Farragut parks.....	840
1 night policeman at McPherson and Farragut parks.....	840
1 day policeman at Stanton Park and neighboring reservations .....	840
1 night policeman at Stanton Park and neighboring reservations .....	840
2 day policemen at Henry (Armory) and Seaton parks, at \$840 each.....	1, 680
2 night policemen at Henry (Armory) and Seaton parks, at \$840 each.....	1, 680
1 day policeman at Mount Vernon Park and adjacent reservations .....	840
1 night policeman at Mount Vernon Park and adjacent reservations .....	840
2 day policemen at grounds south of Executive Mansion, at \$840 each.....	1, 680
1 night policeman at grounds south of Executive Mansion.....	840
1 day policeman for greenhouses and nursery .....	840
1 night policeman for greenhouses and nursery.....	840
1 day policeman at Monument Park.....	840
1 night policeman at Monument Park.....	840
1 day policeman at Monument Park Annex (Potomac Park) .....	840
1 night policeman at Monument Park Annex (Potomac Park) .....	840
1 day policeman at Garfield Park.....	840
2 night policemen at Garfield Park, at \$840 each.....	1, 680
1 watchman for the care of the monument and clock at Wakefield, Va., the birthplace of Washington.....	300

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\$82, 620

## Contingent expenses, public buildings and grounds:

For contingent and incidental expenses, including purchase of professional and scientific books, periodicals, books of reference, blank books, photographs, and maps .....	700
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## Improvement and care of public grounds:

Improvement and maintenance of grounds south of Executive Mansion.....	4, 000
Cement or macadam foot walk around the ellipse, grounds south of Executive Mansion.....	3, 000
Ordinary care of greenhouses and nursery.....	2, 000
Ordinary care of Lafayette Park.....	2, 000
Ordinary care of Franklin Park .....	1, 500
Improvement and ordinary care of Lincoln Park .....	2, 000
Care and improvement of Monument grounds and annex to Monument grounds (Potomac Park) .....	7, 000
Improvement, care, and maintenance of reservation No. 17, and site of old canal northwest of same .....	2, 500



## Improvement and care of public grounds—Continued.

Construction and repair of post-and-chain fences, repair of high iron fences, constructing stone coping about reservations; painting watchmen's lodges, iron fences, vases, lamps, and lamp-posts; manure, and hauling the same; removing snow and ice; purchase and repair of seats and tools; trees, tree and plant stakes, labels, lime white-washing, and stock for nursery, flower pots, twine, baskets, wire, splints, moss, and lycopodium, to be purchased by contract or otherwise, as the Secretary of War may determine; care, construction, and repair of fountains; abating nuisances; cleaning statues and repairing pedestals .....	\$16,050	
For improvement, care, and maintenance of various reservations .....	25,000	
For improvement, care, and maintenance of Smithsonian grounds .....	3,500	
For resurfacing main asphalt roadway in Smithsonian grounds from Seventh to Twelfth streets.....	5,000	
For improvement, care, and maintenance of Judiciary Park.	2,500	
For laying asphalt and other walks in various reservations.	2,000	
For improvement, care, and maintenance of grounds of Executive Departments.....	4,000	
For such trees, plants, shrubs, fertilizers, and skilled labor for the grounds of the Library of Congress as may be requested by the superintendent of the Library building.	1,000	
For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Capitol as may be requested by the superintendent of the Capitol building .....	3,000	
For improvement and maintenance of Executive Mansion grounds (within iron fence).....	5,000	
For the employment of an engineer by the officer in charge of public buildings and grounds .....	2,400	
For purchase and repair of machinery and tools for shops at nursery, for repair of shops building, and for repair of storehouse building.....	1,000	
For broken stone road covering for parks .....	2,000	
For curbing, coping, and flagging for park roads and walks.	2,000	
For establishing, fitting up, and maintaining children's playgrounds .....	3,000	
For completing the improvement of the grounds of Mount Vernon square around the new Public Library building.	13,000	
For care and maintenance of "Sherman Plaza" .....	600	
For care and maintenance of the part of Potomac Park between the causeway of the Pennsylvania Railroad bridge, the Potomac River, and the tidal reservoir.....	3,000	
For one day watchman and two night watchmen for the part of Potomac Park between the causeway of the Pennsylvania Railroad bridge, the Potomac River, and the tidal reservoir, at \$720 each .....	2,160	
For constructing a macadam roadway along the north and west sides of the tidal reservoir, in Potomac Park, from the terminus of the Seventeenth street roadway opposite the bathing beach to the Potomac River entrance to the reservoir, and for improving the grounds on either side of the said roadway, in accordance with plans prepared in the Office of Public Buildings and Grounds, to be expended under the direction of the officer in charge of that office.	50,000	
For the preparation, under the direction of the officer in charge of public buildings and grounds, of preliminary plans and estimates of cost for the location, construction, and equipment of a power house, with distributing mains for heat, steam, and electric power for the propagating gardens, the Washington Monument, the White House, and the buildings in the vicinity thereof, the said officer to report thereon in full to Congress at its next session..	5,000	
		<b>\$175,210</b>

## Care, repairs, fuel, etc., Executive Mansion:

For care, repair, and refurnishing Executive Mansion, to be expended by contract or otherwise, as the President may determine.....	\$35,000	
Fuel for Executive Mansion, greenhouses, and stable .....	6,000	
For care and maintenance of conservatory and greenhouses.	9,000	
For repairs to conservatory and greenhouses.....	3,000	
		<hr/> \$53,000

## Lighting the Executive Mansion and public grounds:

Gas, pay of lamplighters, gas fitters, and laborers, purchase, erection, and repair of lamps and lamp-posts; purchase of matches and repairs of all kinds; stoves, fuel, and lights for office and office stable, for watchmen's lodges, and for greenhouses at nursery: <i>Provided</i> , That for each 5-foot burner not connected with a meter in the lamps on the public grounds not more than \$20 shall be paid per lamp for gas, including lighting, cleaning, and keeping the lamps in repair under any expenditure provided for in this act, and said lamps shall burn every night on the average from forty-five minutes after sunset to forty-five minutes before sunrise, and authority is hereby given to substitute other illuminating material for the same or less price and to use so much of the sum hereby appropriated as may be necessary for the purpose: <i>Provided further</i> , That \$4,200 of the foregoing sum shall be paid from the revenues of the District of Columbia and the remainder from the Treasury of the United States: <i>And provided further</i> , That not more than \$6,000 of said appropriation may be expended for lighting, extinguishing, cleaning, repairing, and painting park lamps of a higher candlepower than those provided for above and not less than 60 candlepower, which lamps shall cost not to exceed \$25 per lamp per annum, and shall otherwise be subject to the restrictions of this paragraph .....	20,000	
For lighting 6 electric arc lights in Executive Mansion grounds within the iron fence 365 nights, at not exceeding \$85 per lamp per annum .....	510	
For lighting 6 electric arc lights at the propagating gardens 365 nights, at not exceeding \$85 per lamp per annum ...	510	
		<hr/> 21,020

## Lighting public grounds, District of Columbia:

For lighting 7 arc electric lights in grounds south of Executive Mansion 365 nights, at not exceeding \$85 per light per annum.....	595	
For lighting 32 electric arc lights in Lafayette, Franklin, Judiciary, and Lincoln parks 365 nights, at not exceeding \$85 per light per annum .....	2,720	
For lighting 14 electric arc lights in grounds south of Executive Mansion and Monument Park 365 nights, at not exceeding \$85 per light per annum.....	1,190	
		<hr/> 4,505

## Repairs to water pipes and fire plugs:

Repairing and extending water pipes, purchase of apparatus for cleaning them, purchase of hose, and for cleaning the springs and repairing and renewing the pipes of the same that supply the Capitol, the Executive Mansion, and the building for the State, War, and Navy Departments.....	2,500	
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## Telegraph to connect the Capitol with the Departments and with the Government Printing Office:

For care and repair of existing lines.....	1,500	
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Total .....	341,055
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*Washington Monument elevator, electric lights, and machinery connected therewith.*

The following estimate for operating the elevator, the electric lights, and the machinery connected therewith for the fiscal year ending June 30, 1907, is submitted:

1 custodian, at \$100 per month .....	\$1, 200	
1 steam engineer, at \$80 per month .....	960	
1 assistant steam engineer, at \$70 per month .....	840	
• 1 fireman, at \$55 per month.....	660	
1 assistant fireman, at \$55 per month .....	660	
1 conductor of elevator car, at \$75 per month .....	900	
1 attendant on floor, at \$60 per month .....	720	
1 attendant on top floor, at \$60 per month.....	720	
3 night and day watchmen, at \$60 per month .....	2, 160	
	<hr/>	\$8, 820
For fuel, lights, waste, oil, packing, tools, matches, paints, brushes, brooms, lanterns, ropes, nails, screws, lead, electric lights, heating apparatus, oil stoves for elevator car and upper and lower floors, repairs to engines, boilers, dynamos, elevator, and repairs of all kinds connected with the Monument and machinery, and purchase of all necessary articles for keeping the Monument, machinery, elevator, and electric plant in good order.....		3, 000
For paving the roadway around the Monument with asphalt .....		7, 500
		<hr/>
		19, 320

*Repair of building No. 516 Tenth street NW., where Abraham Lincoln died.*

For painting and miscellaneous repairs.....	\$200
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*Monument and wharf at Wakefield, Va., the birthplace of Washington.*

For repairs to wharf, damaged by storms of February, 1897, and February, 1905 .....	\$7, 000
For repairs to fences, cleaning up, and maintaining grounds.....	500
	<hr/>
	7, 500

*Sea wall on Potomac River between the Arsenal wall and N street SW.*

For rebuilding the wall its entire length, 1,350 feet.....	\$40, 000
For rebuilding only that part of the wall in front of reservation occupied by Naval Reserves, District of Columbia, 242 feet.....	7, 500
For rebuilding only that part of the wall in front of the reservation occupied by Light-House Board and south to the Arsenal wall, 358 feet.....	10, 800

As some of the preceding estimates are larger than amounts heretofore appropriated, and as some of them are new, the following explanations thereof are submitted:

1. I have asked for an increase of \$50 per annum in the pay of the first sergeant of park police. The duties of this officer are as exacting and onerous as those performed by the sergeants of Metropolitan police, while the pay of the latter is \$1,140 per annum.
2. I have asked for a second sergeant of park police, at \$900 per annum. The one sergeant now in charge of the force is overworked. During the day he has to ride on his bicycle over the whole city inspecting every park policeman, and also inspecting the outlying reservations not looked after by the park policemen. He has to come to this office every morning to make his report and receive instructions; he has to spend several hours a day at the police court several times a week, and in addition he has to inspect the night policemen in the parks three times a week. There should be a second sergeant to assist him.
3. I have asked for an increase of \$120 per annum in the pay of the park policemen. The Washington park policeman is probably the

poorest paid man in the United States who has police duty to perform. He has practically the same duties as the Metropolitan police. The same intelligence and physical qualifications are required of him. His moral character must be good; his discipline is much the same. He has as many arrests to make as the average policeman. He runs the same risks as to injury from vicious people as the man doing duty on the street. His duties are more exacting, as half of his duty hours are spent in cautioning people about violating the rules of the park and in looking after children. He has a uniform to buy once a year in order to look neat; yet the pay of these policemen is only \$60 per month. The city government requires the street railway companies to pay their crossing police officers \$75 per month for a great deal less exacting and laborious duty. The lowest grade on the Metropolitan police force receive \$75 per month, and the officers who serve five or six years faithfully receive \$90 per month. For these reasons the increase in pay asked is strongly recommended. It is also recommended that the designation of these employees be changed from park watchman to park policeman.

4. I have asked for 11 additional park policemen for night duty in parks where there are now no night men. Those 11 parks have now but one policeman each, who patrols them but eight hours out of the twenty-four. Those policemen have in addition from 5 to 20 outside reservations to look after, some of them nearly a mile distant. Their hours of duty are generally from 8 a. m. to noon, and from 4 to 8 p. m. It is just as necessary to have those parks patrolled from noon to 4 p. m. and from 8 to 12 p. m. as at any other hours. During the off hours park loafers take advantage of the absence of the policemen to do about as they please, and subject respectable people to annoyance. For these reasons it is urgently recommended that the increase in the force asked for be granted.

5. I have asked for \$3,000 for a macadam or cement foot walk around the ellipse in the grounds south of the Executive Mansion. This is needed in order that pedestrians may have a definite place to walk upon and keep from wearing the lawn surfaces. During wet weather the gravel roadway around the ellipse becomes muddy and pedestrians take to the edges of the grassed surface. New trespass paths are thus started, which soon become worn and muddy and give the park an unsightly appearance.

6. An increase of \$500 is asked for Franklin Park. The park is almost as large as Lafayette Park (for which \$2,000 is allowed) and is as highly improved. The present allowance of \$1,000 is not sufficient to maintain the park in the condition in which it should be kept, and the small increase asked is recommended.

7. I have asked for an increase of \$1,000 in the appropriation for the Smithsonian grounds. There are in these grounds 58 acres of land, and to keep this large park in proper condition there has been an appropriation of \$2,500 yearly. That amount is not sufficient to do the work required of keeping the lawns, trees, roads, walks, etc., in good condition, and it is respectfully recommended that it be increased to \$3,500 per year.

8. The asphalt-wearing surface of the main roadway in the Smithsonian grounds from Seventh to Twelfth streets is in very bad condition. The surface is almost entirely worn away, so that the binder course is showing over a large part of the road, and it is necessary

that the road be repaired and resurfaced before the base becomes disturbed. The cost of the work will amount to \$5,000, and the appropriation of that amount is recommended.

9. The sum of \$4,000 is asked for the improvement, care, and maintenance of grounds of Executive Departments in place of the \$1,000 now allowed. The number of plants furnished the Executive Departments and their bureaus and offices during the past year, and which in several cases was a less number than they desired to procure, was over 38,000, with a commercial value of about \$3,800. Should the sum asked for be allowed, not only can a more liberal supply of plants be furnished, but skilled labor can also be provided where needed for the proper maintenance of the plantings.

10. An increase of \$1,000 is asked for the improvement and maintenance of Executive Mansion grounds within iron fence. The amount now allowed for the purpose, viz, \$4,000, is not sufficient to care for and maintain these grounds in the way they should be kept, and it is recommended that the increased amount asked for be granted.

11. The sum of \$3,000 is asked for establishing and caring for and maintaining children's playgrounds on public reservations. By existing legislation the officer in charge of public buildings and grounds is authorized to grant the use of the public grounds for children's playgrounds, but it is respectfully submitted that permission to use the grounds for that purpose is not sufficient. An appropriation should be made for fitting them up, and every year the necessary appropriations should be made for their care, extension, and renewals as apparatus is worn out and broken. It is believed that there is no other way in which a small amount of money can be expended which would do more good or give greater pleasure or result in more lasting benefit than money appropriated and expended for fitting up, caring for, and maintaining children's playgrounds.

12. An appropriation of \$13,000 is requested for completing the improvement of the grounds of Mount Vernon square, around the new Public Library building. The estimate submitted by this Office in October, 1901, for the work, amounted to \$25,000, while the appropriation made by Congress for the fiscal year 1903 was but \$10,000, which was sufficient to provide for only a portion of the work. A careful estimate of the cost of the work which should be done to complete the improvement gives the sum of \$13,000, which, if appropriated, will make the total cost of the improvement \$2,000 less than the original estimate. It is earnestly recommended that the sum requested be granted.

13. I have asked for \$600 for the care and maintenance of "Sherman Plaza," the site of the statue of General Sherman, at the northeast corner of the President's Park, south of the Treasury Department building. These grounds were highly improved during the past fiscal year as described elsewhere in this report, and the improvements should be maintained.

14. An estimate of \$3,000 is submitted and recommended for the care and maintenance of the part of Potomac Park lying between the causeway of the Pennsylvania Railroad bridge, the Potomac River and the tidal reservoir. In sundry civil act approved March 3, 1905, an appropriation of \$65,000 was made for the improvement of this ground and the work will be completed by June 30, 1906. After that date funds should be provided annually for maintaining the improvements,

and the estimate referred to is submitted for the service of the fiscal year ending June 30, 1907.

15. An estimate of \$2,160 is submitted for the employment of one day watchman and two night watchmen for the area of ground mentioned in the preceding paragraph. This ground contains 50 acres, and after it is improved should not be left unprotected. It is too remote from the Monument grounds for the watchmen in those grounds to look after it. Moreover, their presence is required continually in that park. It is earnestly recommended that the watchmen requested be provided.

16. An estimate of \$50,000 is submitted for the construction of a macadam roadway on the north and west sides of the tidal reservoir in Potomac Park. That part of the park has never been accessible in a pleasant way for the people of Washington, and this roadway is intended to make it so.

17. An item is submitted for the preparation of preliminary plans, with estimates of cost, for the erection of a building for supplying heat, steam, and electric power to the propagating gardens, the Washington Monument, the White House, and the buildings in its vicinity. The necessity for a central heating plant for the propagating gardens to take the place of the twenty separate furnaces and boilers now there is apparent, but it is thought it will be more desirable to erect a building to also supply the wants of the Washington Monument, the White House, and the buildings in the vicinity of the latter; and it is recommended that the amount requested for the preparation of preliminary plans be provided.

18. I have asked for an increase of \$10 per month in the pay of the assistant engineer at the Washington Monument, and that the pay of the fireman and the assistant fireman there be placed at \$55 per month each instead of the \$50 and \$45, respectively, now paid. The assistant engineer is often called upon in addition to the regular duties assigned him to take charge of the power plant, and also to operate the elevator during the absence of the first engineer and the elevator conductor, whose compensations are \$80 and \$75 per month, respectively. His services are well worth the compensation, viz, \$70 per month, recommended, and it is hoped that the small increase will be granted.

There is no reason known to this Office why one of the firemen should be paid less than the other, as their duties and responsibilities are the same. Firemen in the Executive Departments are paid \$60 per month for duties no less exacting than those performed by the firemen at the Monument. It is recommended that their pay be increased to \$55 per month, as submitted.

The road surrounding the Monument is a gravel road. The hill on which the Monument stands is a very windy spot, and during dry and windy weather the air around the Monument is filled with flying sand and gravel, which is painful and annoying to all within. This annoyance can be remedied by paving the roadway with asphalt, and an appropriation of \$7,500 for the purpose is recommended.

19. An estimate of \$7,000 for the repair of the United States wharf at Wakefield, Va., the birthplace of Washington, and one of \$500 for repairing the fences and cleaning up the grounds are submitted and recommended.

The wharf is an iron-pile wharf, with timber deck, and was badly damaged by a severe storm and ice jam in February, 1897. An estimate

for its repair was submitted last year. In the present estimate the amount is increased by \$3,000, as additional damage was caused to the wharf by ice in February, 1905, as mentioned elsewhere in this report. In its present condition it is useless for the purpose for which it was built, viz, as a landing for steamers carrying visitors to the monument at the birthplace.

The grounds are very much overgrown with underbrush, which should be cut and the grounds cleared up. The wire fence on either side of the road leading from the wharf to the monument is also badly in need of repairs.

20. By direction of the War Department an estimate for rebuilding the sea wall along that part of the Potomac River front under the charge of this Office, viz, between the arsenal wall and the southern curb line of N street south, is submitted. The entire length of the front is 1,350 feet and it is estimated that to rebuild the wall of roughly squared stone laid in Portland cement mortar will cost approximately \$30 per linear foot of wall 12 feet high, or say \$40,000. The Naval Reserve of the District of Columbia and the Light-House Board each occupy a part of this front, and in case it should be desired to rebuild the wall only in front of the reservations occupied by those Government Departments a separate estimate is made for each reservation, except that the estimate for the length of wall along the light-house reservation (93 feet) includes also the front from the south side of that reservation to the arsenal wall (265 feet), a total length of 358 feet.

*Financial statement for fiscal year ending June 30, 1905.*

Title of appropriation.	Available at beginning of fiscal year.	Appropriated since.	Expended during fiscal year.	Pledged by contract.	Unexpended balance to revert to Treasury.
Improvement and care of public grounds, District of Columbia, 1905.....	\$94,550.00	<sup>a</sup> \$2,000.00	\$93,947.57	\$397.00	\$2,205.43
Improvement and care of public grounds, 1905.....	13,400.00		13,261.75		138.25
Repairs, fuel, etc., Executive Mansion, 1905.....	59,000.00		57,251.42	1,748.13	.45
Lighting, etc., Executive Mansion, etc., 1905.....	21,020.00		19,078.27		1,941.73
Lighting public grounds, District of Columbia, 1905.....	4,505.00		4,482.43		22.57
Repairs to water pipes, 1905.....	2,500.00		4,453.60		46.40
Telegraph to connect the Capitol with the Departments and the Government Printing Office, 1905.....	1,500.00		1,295.63	204.00	.37
Contingent expenses, public buildings and grounds, 1905.....	700.00		694.47		5.53
Salaries of employees, public buildings and grounds, 1905.....	68,110.00		66,841.91		1,268.09
Care and maintenance of the Washington Monument, 1905.....	14,020.00	<sup>b</sup> 2,500.00	14,407.68	900.00	1,212.32
Purchase and repair of building where Abraham Lincoln died.....	88.20		88.20		
Electric plant, Washington Monument.....	1,604.43		1,604.43		
Equestrian statue of Gen. William T. Sherman.....	9,801.03	<sup>a</sup> 700.00	9,685.37		
Pedestal for statue of Gen. Philip H. Sheridan.....	50,000.00				
Pedestal for statue of Gen. George B. McClellan.....	50,000.00		8,000.00	42,000.00	
Designs for memorial or statue of Gen. Ulysses S. Grant.....	125.21				125.21
Memorial to Gen. Ulysses S. Grant.....	49,100.00			49,100.00	
Monument to Gen. Hugh Mercer, Fredericksburg, Va.....	24,958.42		8,031.24	14,500.00	
Statue of Brig. Gen. Count Casimir Pulaski.....	49,866.97		1,838.05		
Statue of General Baron von Steuben.....	50,000.00		109.48		
Statue of Thomas Jefferson.....	5,000.00				

<sup>a</sup> Deficiency act, Mar. 3, 1905.

<sup>b</sup> Deficiency act, Jan. 5, 1905.



I desire to express my appreciation of the faithful services rendered during the past year by the entire force under this Office.

Attention is invited to a description of some rare tropical plants at the propagating gardens, prepared by Mr. George H. Brown, the landscape gardener, contained in Appendix B to this report, and to the plants as shown in the frontispiece.

There is also herewith as Appendix C a list giving the botanical and common names of the trees and shrubs in the White House grounds, Lafayette Park, Franklin Park, McPherson Park, Farragut Park, Dupont Circle, Iowa Circle, Washington Circle, Sherman Plaza, Lincoln Park, Stanton Park, Folger Park, and Marion Park, and accompanying plans showing their locations, also compiled by the landscape gardener.

I am, General, very respectfully, your obedient servant,

CHAS. S. BROMWELL,

*Colonel, U. S. Army, Captain, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

APPENDIX A.

Inventory of public property, Executive Mansion, June 30, 1905.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
THIRD FLOOR.					
Attic.					
Awnings.....					
Bed, iron.....					
Mattress, hair.....					
Pillows, feather.....					
Racks, towel, oak.....					
Commodes, oak.....					
Rack, hat, walnut.....					
Bed, maple, double.....					
Corner seats.....					
Bookcase, revolving.....					
Bookcase, mahogany.....					
Stands, umbrella, walnut.....					
Chairs, side, mahogany.....					
Cans, umbrella, tin, painted green.....					
Screen, fire, brass.....					
Table, walnut, breakfast.....					
Awnings, window, canvas.....					
Awnings for receptions.....					
Awnings for large bow windows.....					
Fenders for radiators in vestibule.....					
Boxes, wooden.....					
Flags, post.....					
Flags, storm.....					
Boxes, pine, with locks, to store curtains.....					
Chairs, camp, wooden.....					
Tables, round, oak.....					
Axes.....					
Hose, canvas.....					
Table, wicker, round.....					
Chairs, wicker, arm.....					
Chairs, wicker, rocking.....					
Settees, wicker.....					
Shades, window.....					
Curtains, tapestry (17 yards).....					
Mirrors.....					
Rug, Smyrna.....					
Washstand.....					
Chairs.....					
Chairs, rocking.....					
Tubs, foot.....					
Toilet sets.....					
Clock.....					
Spring, woven wire.....					
Washstand, maple, marble top.....					
Tables, small, ebonized.....					
Rack, towel, ash.....					
Chair, wicker.....					
Cushion, chair.....					
Carpet.....yards.....					
Bureau, walnut.....					
Couch, walnut, upholstered.....					
Desk, writing, walnut.....					
Chiffoniers, oak.....					
Figures, bronze, female.....					
Foot bath, tin.....					
Chair, rocking, cherry, cane seat.....					
Scarf, table, plush, dark green.....					
Bowl, wash, china, thick.....					
Pitcher, china, thick.....					
Matting, whit. China.....yards.....					
Shade, white, Holland.....					
Shade, green, Holland.....					
Beds, single, iron.....					
Springs, single.....					
Mattresses, hair.....					





Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
THIRD FLOOR—continued.					
Attic—Continued.					
Pillows, feather.....					
Bureau, rosewood, marble top.....					
Chiffonier, walnut.....					
Stand, wash, cherry, marble top.....					
Table, lacquered.....					
Chairs, side, rosewood, upholstered.....					
Chair, side, cherry, cane seat.....					
Chair, side, ebonized, upholstered.....					
Bookcase, pine.....					
Clock, black marble.....					
Basket, waste, wooden.....					
Toilet set, 5 pieces, odd.....					
Foot rests, mahogany, upholstered in leather.....					
Tray, silver-plated.....					
Pillows, sofa, covered with satin damask.....					
Chairs, mahogany, seats upholstered in leather.....					
Boxes, wooden.....					
Covers, loose Canton flannel.....					
Chairs, band.....					
Chairs, gilt.....					
Dresser, golden oak.....					
Clock.....					
Cushions, felt for gilt chairs.....					
Rugs, made from carpet.....					
Chairs, bent wood, gilded.....		Dec. 30, 1904	\$4.25	\$637.50	W. B. Moses & Sons.
Covers, loose, for gilded chairs.....		Feb. 1, 1905		170.20	E. J. Kennedy
Shades, window.....		Mar. 8, 1905	1.50	9.00	do
Toilet set, china, 8 pieces.....					
Towel rack.....					
Refrigerator, nursery.....					
Cabinets, ebonized.....					
Fender, brass.....					
Bed, folding, walnut.....					
Stands, flower, wood, ebonized.....					Transferred from landing and stairs.
Rugs, made from carpet.....					do
Rocker, mahogany, high back.....					Transferred from main corridor.
Attic bathroom.					
Stand, towel.....					
SECOND FLOOR.					
Northwest bed or dressing room.					
Shades, window, green Holland.....					
Carpet, Wilton..... yards.....					
Seat, window, upholstered in blue.....					
Commode, mahogany.....					
Chair, rocking, with cushion, mahogany.....					
Chair, mahogany, side.....					
Desk, mahogany.....					
Bureau, mahogany.....					
Chiffonier, mahogany.....					
Table, mahogany, invalid's.....					
Chair, arm, upholstered in blue.....					
Fireboard, brass.....					
Laces, Brussels..... pairs.....					
Mirror, mahogany, small.....					
Chair, side, walnut.....					
Foot tub, tin.....					
Footstool, wicker, painted white.....					
Mug, toothbrush.....					
Curtains, cretonne..... pairs.....					
Northwest bathroom.					
Seat, bath.....					
Carpet, Wilton, velvet..... yards.....					

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		4		4				June 30, 1905	4
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		4		4				do	4
		10		10				do	10
		2		2				do	2
		250		250				do	250
		60		60				do	60
		150		150				do	150
		1		1				do	1
		1		1				do	1
		100		100				do	100
		2		2				do	2
24	Jan. 24, 1905		150	150				do	150
57	Feb. 25, 1905		150	150				do	150
12	Mar. 10, 1905		6	6				do	6
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1	1	Sold	The President		
			1	1					1
			2	2					2
			1	1		Broken			1
		1		1				June 30, 1905	1
		6		6				June 30, 1905	6
		74		74				do	74
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1		Broken		do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				June 30, 1905	1
		4½		4½				do	4½

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Northwest bathroom.					
Shades, window, green Holland .....					
Desk, mahogany .....					
Bedsteads, brass .....					
Springs, woven wire .....					
Mattresses, hair, two pieces each .....					
Couch, upholstered in blue .....					
Chair, corner .....					
Seat, window .....					
Cushions, for rockers .....					
Hassocks .....					
Screen, 3-fold satin damask .....					
Wardrobe, walnut .....					
Wardrobe, mahogany .....					
Chairs, rocking, painted white .....					
Chair, rocking, mahogany .....					
Table, mahogany .....					
Stands, mahogany .....					
Table, painted .....					
Chiffonier, mahogany .....					
Dresser, rosewood .....					
Chairs, side, mahogany .....					
Fender, brass .....					
Fender, wire, spark .....					
Fire tools, brass, complete .....	set.				
Andirons, brass .....					
Fireboard, brass .....					
Clock, black marble .....					
Curtains, heavy blue satin damask .....	pairs.				
Laces .....	do				
Basket, wooden, waste-paper .....					
Pillows, sofa, blue satin damask .....					
Bookcase, mahogany .....					
Quilt, bed .....					
Curtains, sash .....	pair.				
Awnings, window .....					
Screen, 3-fold, mahogany .....					
Rug, carpet, Wilton, solid green .....	yards.				
Screen .....					
Chair arm, upholstered in blue .....					
Curtains, for windows, old material interlined with old flannel, lined with new satin, trimmed with fringe, gimp cord, tassel loops and center tassels, new rods and fixtures, pairs.					
•					
Bedroom, west of alcove hall, north side.					
Cabinet, china .....					Transferred from corridor.
Carpet, blue, Brussels .....	yards.				
Laces, renaissance .....	pair.				
Curtains, heavy blue satin damask .....	pairs.				
Bedsteads, iron and brass .....					
Springs for above .....					
Mattresses, hair .....					
Pillows, feather .....					
Bureau, mahogany .....					
Bureau, rosewood .....					
Washstand, mahogany .....					
Wardrobe, rosewood .....					
Table, rosewood, marble top .....					
Chiffonier, walnut, painted white .....					
Desk, walnut, painted white .....					
Table, lacquered, painted white .....					
Couch, upholstered in blue damask .....					
Chair, Turkish, upholstered in blue damask .....					
Chair, arm, upholstered in blue damask .....					
Chairs, side, upholstered in blue damask .....					
Seat, window, upholstered in blue damask .....					
Pillows, sofa, upholstered in blue damask .....					
Quilt, silk .....					

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
.....	.....	4	.....	4	.....	.....	.....	June 30, 1905	4
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	3	.....	3	.....	.....	.....	do	8
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	96½	.....	96½	.....	.....	.....	do	96½
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	1	1	.....	.....	.....	June 30, 1905	1
.....	.....	77½	.....	77½	.....	.....	.....	do	77½
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Bedroom, west of alcove hall, north side—Con.					
Basket, wooden, waste paper.....					
Candlesticks, china.....					
Vases, china, decorated in blue.....					
Vase, flower, dark green.....					
Toilet set, Japanese, 6 pieces.....					
Mug, china, small.....					
Clock, brass, and glass.....					
Match safe, Wedgewood, blue.....					
Mirror, gold frame.....					
Andirons, brass..... pair.					
Fender, brass.....					
Fire tools, complete..... set.					
Vase, flower, glass.....					
Chair, rocking, cherry.....					
Hassock.....					
Lamp.....					
Shade, silk.....					
Table, walnut, painted white, marble top.....					Transferred from landings and stairs.
Quilts, bed.....					
Screen.....					
Screen, Japanese.....					
Hamper, clothes.....					
Wardrobe, rosewood, plate-glass door (mirror).....					
Shade, window, green.....					
Curtains, cretonne..... pair.					
Hamper.....					
Awning.....					
Towel rack.....					
Vases, glass, engraved.....					
Pitcher, water, china.....					
Mirror, covered plush frame.....					
Dresser, rosewood, painted white.....					Transferred from servants' rooms.
Bedroom, east of alcove hall, north side.					
Shade, window, green.....					
Table.....					
Carpet, Brussels..... yards.					
Laces, Brussels..... pair.					
Beds, brass, 3 feet 6 inches wide.....					
Springs.....					
Mattresses, hair.....					
Pillows, feather.....					
Quilts, silk.....					
Bureau.....					
Chair, Turkish, upholstered.....					
Chair, side, upholstered.....					
Couch.....					
Clock, black marble.....					
Vases, bronze.....					
Vases, bronze, small.....					
Fire tools, brass, complete..... set.					
Basket, iron, grate.....					
Bottles, cut glass.....					
Basket, wooden, waste.....					
Seat, window, upholstered in pink satin damask.....					
Pillow, sofa, covered with satin damask.....					
Statuettes.....					
Picture, Christ in the Temple.....					
Picture, Madonna.....					
Picture, Madonna at organ.....					
Chair, maple, rocking, with cushion.....					
Slip covers.....					





Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Bedroom, east of alcove hall, north side—Con.					
Rug, carpet Wilton, red, white figure.. yards..					
Wardrobe, mahogany.....					
Table, maple.....					
Curtains, cretonne..... pairs..					
Chair, rocking .....					
Mirror, frame covered with plush .....					
Large northeast bedroom.					
Curtains, window, muslin .....					
Covers, table, plush.....					
Splasher, washstand.....					
Shades, window, green.....					
Rocker, white .....					
Bedstead, mahogany, canopy draped.....					
Table, mahogany, toilet.....					
Mirror, mahogany, gilt.....					
Mirror, mahogany, cheval glass.....					
Wardrobe, mahogany.....					
Table, mahogany, writing.....					
Table, mahogany, night.....					
Table, mahogany, round .....					
Bureau, mahogany, chest of drawers.....					
Washstand, mahogany.....					
Carpet .....					
Curtains, white ground material, lined. pairs..					
Awning .....					
Small northeast bedroom.					
Curtains, window, muslin .....					
Shades, window, green .....					
Bedstead, 4-0 brass.....					
Bed spring, upholstered .....					
Mattress .....					
Bureau, painted .....					
Table, writing, painted.....					
Table, night, painted.....					
Chairs, painted, light.....					
Carpet .....					
Curtains, cretonne..... pairs..					
Awnings.....					
Small southeast bedroom.					
Curtains, window, muslin .....					
Shades, window, green .....					
Comfort, down.....					
Bed, 4-0 brass.....					
Bed spring, upholstered .....					
Mattress, hair.....					
Bureau, painted green and white.....					
Table, writing, painted green and white.....					
Table, night, painted green and white .....					
Chairs, painted green and white, in cotton.....					
Carpet .....					
Curtains, rose armure..... pairs..					
Large southeast bedroom.					
Curtains, window, muslin .....					
Covers, table, plush.....					
Splasher, washstand.....					
Shades, window .....					
Comfort, down.....					
Couch, upholstered in blue .....					
Chair, rocker, white.....					
Bedstead, mahogany, canopy .....					
Bedspring, upholstered.....					

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		115		115				June 30, 1905	115
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1	1	Thrown away, broken, worth- less.			
		2		2				June 30, 1905	2
		2		2				do	2
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		2		2				June 30, 1905	2
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		2		2				do	2
		2		2				do	2
		2		2				June 30, 1905	2
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		2		2				do	2
		2		2				June 30, 1905	2
		2		2				do	2
		1		1				do	1
		3		3				do	3
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1

## 2684 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Large southeast bedroom—Continued.					
Mattress .....					
Table, mahogany, toilet .....					
Mirror, gilt, toilet, colonial .....					
Mirror, mahogany, cheval glass .....					
Wardrobe, mahogany .....					
Table, mahogany, writing .....					
Table, mahogany, night .....					
Table, mahogany, round .....					
Bureau, mahogany, chest of drawers .....					
Sofa, in cotton .....					
Washstand, mahogany .....					
Carpet .....					
Curtains, white ground material, lined, complete, pairs .....					
Hamper, clothes .....		Mar. 9, 1905		\$3.50	Dulin & Martin Co.
Library, south side.					
Silk, china .....	yards				
Cover, desk .....					
Mat, lamp .....					
Shades, window, green .....					
Curtains, heavy satin damask .....	pairs				
Laces, renaissance .....	do				
Bookcases, walnut, small .....					
Bookcase, revolving .....					
Table, rosewood, inlaid and carved .....					
Sofas, upholstered, wool tapestry .....					
Lounge, upholstered, wool tapestry .....					
Chairs, Turkish, wool tapestry .....					
Chairs, side, wool tapestry .....					
Chair, arm, straight back .....					
Chair, arm, rosewood, upholstered .....					
Chair, arm, overstuffed .....					
Medallion, in frame .....					
Piano, upright Bradbury .....					
Bronze bust, George Washington .....					
Vases, bronze .....					
Figures, bronze women .....					
Clock, black marble with bronze top .....					
Statue, bronze, equestrian, General Jackson .....					
Candelabra, brass, 3 lights .....					
Vase, china, decorated in blue and gold .....					
Stool, piano, revolving .....					
Fire tools, brass, complete .....	set				
Andirons, brass, complete .....	pair				
Cuspidors, brass .....					
Piano cover, green plush .....					
Mat, table, green plush .....					
Painting, oil, John Hampden .....					
Water color, statue, Daniel Webster .....					
Mirror, gilt frame .....					
Lamp .....					
Shade, lamp, umbrella .....					
Water color, marine scene .....					
Water color, marine scene .....					
Pillows, plush .....					
Pole, curtain, brass, with rings and brackets .....					
Table, tea, mahogany .....					
Screen .....					
Lamp .....					
Globe, lamp .....					
Tables, side, high, marble-top .....					
Chairs, mahogany, solid-wood backs .....					
Covers, loose, cotton damask .....					
Rug, Scotch woven, oval shape .....					
Room west of library.					
Shades, window, green .....					
Curtains, heavy, red satin damask .....					
Shades, white, Holland .....					



2686 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Room west of library—Continued.					
Bedstead, youth's single.....					
Chairs, arm, upholstered in satin.....					
Chairs, arm, upholstered in damask.....					
Couch, upholstered in satin damask.....					
Chair, rocker, cherry, with cushion.....					
Screen, 3-fold, cherry, stained.....					
Desk, mahogany.....					
Bureau, rosewood.....					
Dresser, rosewood.....					
Wardrobe, walnut.....					
Washstand, walnut.....					
Andirons, brass..... pair.					
Fire tools, brass, complete..... set.					
Fender, brass.....					
Basket, wooden, waste paper.....					
Candlesticks, brass and glass..... pair.					
Statuettes, fisherman and fisherwoman..... do.					
Clock, brass and glass.....					
Vases, flower, Japanese.....					
Vases, white and gold; scenes from the desert.....					
Vases, red and gold.....					
Matchsafe, brass.....					
Stand, ebony.....					
Shade, lamp, red, umbrella.....					
Slip covers.....					
Chair, rocking, mahogany, high back.....					
Chair, rocking, mahogany, low.....					
Cushion.....					
Mattress, hair.....					
Towel rack, walnut.....					
Cabinet, china.....					Transferred from corridor.
Southwest bedroom.					
Mattress, hair.....					
Bolster.....					
Rug, green Wilton carpet.....					
Curtains, heavy light-green satin damask, pairs.....		June 27, 1905	\$15.00	\$30.00	A. E. Kennedy
Laces, Renaissance..... pairs.					
Beds, brass, 4.....					
Mattress, hair.....					
Pillows, feather.....					
Springs.....					
Glass, pier, mahogany.....					
Washstand, walnut, marble top, high back.....					
Wardrobe, mahogany.....					
Dresser, walnut, marble top.....					
Dresser, mahogany, marble top.....					
Lounge, upholstered.....					
Chairs, arm, upholstered.....					
Chair, arm, upholstered, high back.....					
Chairs, side, upholstered.....					
Seats, window.....					
Pillows, sofa.....					
Table, walnut, marble top.....					
Table, round, mahogany.....					
Toilet set, 7 pieces.....					
Fender, brass.....					
Andirons, brass.....					
Fire set, brass, complete.....					
Basket, brass, waste.....					
Clock, black marble.....					
Ornaments, black marble, to accompany clock.....					
Vases, flower.....					
Photograph, President Arthur in gilt frame.....					
Engravings, in gilt frames.....					

## APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2687

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

[illegible]

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Southwest bedroom—Continued.					
Table, lacquered.....					
Vases, flower, cut glass.....					
Vase, flower.....					
Mirror, brass, oval, easel back.....					
Lamp.....					
Carpet, Wilton, velvet.....yards.					
Covers, bureau.....					
Cover, dressing case.....					
Cover, side table.....					
Cover, table, plush.....					
Shams, pillow.....					
Quilt, bed.....					
Bed, brass.....					
Spring, box.....					
Pillow, hair.....					
Pad, desk.....					
Rack, pen.....					
Inkstand.....					
Screen.....					
Basket, waste.....					
Scarf, bureau.....		Sept. 23, 1904	\$7. 60	\$7. 60	A. E. Kennedy..
Supporters, book.....pairs.					
Blankets, Roman.....					
Awnings, window.....					
Covers, loose.....					
Basket, waste, wooden.....					
Curtains, window, French swias.....pairs.		Sept. —, 1904		46. 50	A. E. Kennedy..
Curtains, bed (for making).....do.		June 27, 1904	15. 00	15. 00	.....do.....
Fender, brass.....					
Fire tools, brass, complete.....set.					
Bed, double, rosewood, carved.....					
Mattresses, hair.....					
Bolsters, feather.....					
Canopy, gilt, over bed.....					
Silk, blue moire.....yards.					
Lining, sateen.....do.					
Carpet, velvet, for rug.....do.					
Carpet, border, velvet, for rug.....do.					
Damask, silk.....do.					
Damask, silk.....do.					
Interlining, for draperies, etc.....do.					
Sofa, in cotton.....					
Curtains, for windows, cream ground silk, lined with satinet, interlined with flannel, front and bottom ornamented with gimp cord loops, with slides, center tasscl, pairs.					
Southwest dressing room.					
Rug, Wilton, green.....					
Sofa, upholstered.....					
Chair, arm, upholstered.....					
Chair, side, upholstered.....					
Seat, window, upholstered.....					
Pillows, sofa.....					
Bureau, rosewood.....					
Desk, writing, inlaid.....					
Basket, wooden, waste paper.....					
Fender, fire, brass.....					
Fire tools, brass, complete.....set.					
Basket, grate, iron.....					
Sideboard top, oak.....					
Figure, bronze, storks.....					
Figure, bronze, pheasant.....					
Vases, flower.....					
Candlesticks, brass.....					
Statuette, bisque.....					
Match safe, brass.....					
Bed, folding, walnut.....					
Mattresses, hair.....					
Pillows, feather.....					



Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		1		1				June 30, 1905	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		121		121				do	121
		2		2				do	2
		1		1				do	1
		1		1				do	1
		2		2				do	2
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
90	Sept. 30, 1904	1	1	2				do	2
		3		3				do	3
		2		2				do	2
		2		2				do	2
		6		6				do	6
		1		1				do	1
18	Sept. 17, 1904		2	2				do	2
12	July 9, 1904		1	1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		12		12				do	12
		50		50				do	50
		58		58				do	58
		84		84				do	84
		66½		66½				do	66½
		10½		10½				do	10½
		100		100				do	100
		1		1				do	1
		2		2				do	2
		1		1				June 30, 1905	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		5		5				do	5
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		2		2				do	2
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Southwest dressing room—Continued.					
Dish, soap, silver plated .....					
Chair, walnut, cane .....					
Laces, renaissance .....					
Screen, 4-fold, black .....					
Awnings, window .....					
Rugs, oriental .....					
Chiffonier, walnut.....					
Stand, shaving, mahogany .....					
Rack, towel, walnut.....					
Chairs, side, walnut, cane seat .....					
Wardrobe, walnut .....					
Hamper, clothes.....					
Shade, white Holland .....					
Shades, green.....					
Curtains, window, French swiss.....pairs..		Sept., 1904		\$46.50	A. E. Kennedy..
Bottles, cut glass.....					
Match safe, bronze.....					
Southwest bathroom.					
Curtains, sash.....pairs..		Sept., 1904	\$5.70	5.70	A. E. Kennedy .
Dish, soap.....					
Upper corridor, second floor.					
Lace net, for curtains .....	yards..				
Silk, china .....	do....				
Curtains, silk and net.....	pairs..				
Curtains, net .....	do....				
Cabinets, ebonized .....					
Cabinets, mahogany .....					
Stands, mahogany, marble top.....					
Table, mahogany, long .....					
Chairs,arm,mahogany,upholstered in leather.....					
Chairs, arm, mahogany, upholstered in satin damask.....					
Chairs, side, mahogany, upholstered in satin damask.....					
Settees, mahogany, upholstered in leather .....					
Chairs,side,mahogany,upholstered in leather.....					
Screen, ebonized, 6-fold .....					
Seats, corner, upholstered in satin damask .....					
Pillows, sofa, covered with satin damask.....					
Painting, oil, General Grant.....					
Engraving, Queen Victoria landing at Portsmouth.....					
Bowl, covered, papier-maché.....					
Jardinières, brass .....					
Vases, high, Italian marble.....					
Figure,bronze,woman with Cupid on shoulder .....					
Figure,bronze,woman with Cupid at feet.....					
Figure, bronze .....					
Jardiniere, bronze, low .....					
Table, ebony, marble top .....					
Table, ebony, square top.....					
Stand, ebony, carved .....					
Settee, upholstered in green satin damask.....					
Chairs,arm,upholstered in green satin damask.....					
Seat, window, long.....					
Cushion, for long window seat, satin damask.....					
Stand, high, mahogany.....					
Bookcase, revolving, walnut .....					
Chair, rocking, low, mahogany.....					
Chair, rocking, high, mahogany, cane seat.....					
Figure, bronze, woman with lyre.....					
Photograph, framed in oak, (cathedral).....					
Photograph, framed in oak (Coliseum at Rome).....					
Photograph, framed in oak, "Gladiator" .....					



2692 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Upper corridor, second floor—Continued.					
Vases, Hungarian ware.....	.....	.....	.....	.....	.....
Jardiniere, English.....	.....	.....	.....	.....	.....
Vase, flower, Dresden, 4 posts.....	.....	.....	.....	.....	.....
Table, round, mahogany.....	.....	.....	.....	.....	.....
Clock, mahogany.....	.....	.....	.....	.....	.....
Portrait, oil, President Millard Fillmore.....	.....	.....	.....	.....	.....
Portrait, oil, James A. Garfield.....	.....	.....	.....	.....	.....
Chair, rocking, mahogany.....	.....	.....	.....	.....	.....
Pillows, down, covered with red velour.....	.....	.....	.....	.....	.....
Table, tea, mahogany.....	.....	.....	.....	.....	.....
Screen.....	.....	.....	.....	.....	.....
Table.....	.....	.....	.....	.....	.....
Shade, lamp.....	.....	.....	.....	.....	.....
Basket, music.....	.....	.....	.....	.....	.....
Lamp, B. and H., with shade.....	.....	.....	.....	.....	.....
Rugs, Wilton, with fringe.....	.....	.....	.....	.....	.....
Table, small, ebonized.....	.....	.....	.....	.....	.....
Table, carved, Flemish oak.....	.....	.....	.....	.....	.....
Rugs, made from carpet, "Item 5".....	.....	.....	.....	.....	.....
Cover, loose, cotton damask.....	.....	.....	.....	.....	.....
Curtains, for windows at east and west ends, pairs.....	.....	Sept., 1904	.....	\$105.00	A. E. Kennedy..
Chairs, arm, upholstered in leather.....	.....	.....	.....	.....	Transferred from landing and stairs.
Stand, flower, wood, ebonized.....	.....	.....	.....	.....	do.....
Upper corridor, east end.					
Carpet.....	.....	.....	.....	.....	.....
Cover, loose cotton damask.....	.....	.....	.....	.....	.....
Chairs, side; Flemish oak.....	.....	.....	.....	.....	Transferred from usher's room.
Small southwest bedroom.					
Curtains, cretonne..... pairs.....	.....	.....	.....	.....	.....
Oval library.					
Kidney desk, mahogany.....	.....	Nov. 23, 1904	\$12.50	12.50	Woodward & Lothrop.
Shade, lamp.....	.....	.....	.....	.....	.....
Shade.....	.....	Dec. 8, 1904	2.75	2.75	do.....
Lamp.....	.....	Dec. 6, 1904	15.00	15.00	C. A. Muddiman & Co.
President's study.					
Rug, Wilton carpet.....	.....	.....	.....	.....	.....
Curtains, window, brown velour, poles, cords, etc., pairs.....	.....	.....	.....	.....	.....
Bookcase, oak.....	.....	.....	.....	.....	.....
Lamp, electric desk, 2 lights, dark, fire gilt, and shades.....	.....	.....	.....	.....	.....
Elevator halls.					
Matting, white China..... yards.....	.....	.....	.....	.....	.....
Small sewing room, north side.					
Awning.....	.....	.....	.....	.....	.....
Large southeast bathroom.					
Curtain, sash.....	.....	Sept. 23, 1904	1.50	1.50	A. E. Kennedy..
Large northeast bathroom.					
Curtains, sash.....	.....	Sept. 30, 1904	1.50	3.00	A. E. Kennedy..

APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2693

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		3		3				June 30, 1905	3
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		4		4				do	4
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2	1	Lost when sent to be cleaned.		do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
18	Sept. 17, 1904	1		1				do	1
		2	4	6				do	6
			2	2				do	2
			1	1				do	1
		1		1				June 30, 1905	1
		1		1				do	1
			1	1				do	1
		2		2				June 30, 1905	2
23	Jan. 24, 1905	1		1				June 30, 1905	1
			1	1				do	1
23	do		1	1				do	1
35	Feb. 15, 1905		1	1				do	1
		1		1				June 30, 1905	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		25½		25½				June 30, 1905	25½
		1		1				June 30, 1905	1
90	Sept. 30, 1904		1	1				June 30, 1905	1
90	Sept. 30, 1904		2	2				June 30, 1905	2

2694 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Landings and stairs.					
Matting .....	yards.				
Chairs, arm; rosewood; upholstered in leather.					
Stands, flower; wood; ebonized .....					
Table, walnut, painted white; marble top .....					
Matting, white .....	yards.				
Box for wood .....					
Rugs made from carpet .....					
Awning .....					
FIRST FLOOR.					
Pantry.					
Teapot .....					
Table, breakfast, walnut .....					
Table, long, mahogany .....					
Hamper, clothes, wicker .....					
Clock, wooden, 8-day .....					
Kettle, tea, galvanized iron .....					
Ice shaver, galvanized iron .....					
Trays, japanned .....					
Canister, tea, tin, japanned .....					
Towels, glass .....	dozen.				
Towels, roller .....	do.				
Tray, bread .....					
Knife, carving .....		Nov. 29, 1904	\$0.75	\$0.75	Dulin & Martin Co.
Fork, carving .....		do.	.75	.75	do.
Knife, ham .....					
Refrigerator, nursery .....					
Steel, knife .....					
Tray, wood .....					
Chest, cake .....					
Boxes, sugar .....					
Corkscrew .....					
Squeezer, lemon .....					
Basket for silver .....					
Coffeepot, small, tin .....					
Linoleum .....	yards.				
Teapots .....					
Plate warmer, electric .....					
Refrigerator .....					
Teapots .....					
Ice crusher .....					
Mustard holder .....		Oct. 31, 1904		.75	Dulin & Martin Co.
Mats, asbestos .....		Nov. 25, 1904		10.00	Woodward & Lothrop.
Beef press .....		Feb. 17, 1905		1.75	Dulin & Martin Co.
Goblets .....	dozen.				
Mops, dish .....					
Brushes for cleaning silver .....		Sept. 27, 1904	.40	1.60	Dulin & Martin Co.

APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2695

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		48		48	48	Worn-out in serv- ice; worthless.			
		2		2	2	Transferred upper corridor.			
		2		2	2	Transferred; 1 to upper corridor, 1 to attic.			
		1		1	1	Transferred to bed- room west of al- cove hall.			
		200		200	200	Worn-out in serv- ice; worthless.			
		1		1	1	Transferred office building.			
		2		2	2	Transferred to ser- vants' rooms in attic.			
		1		1	1	Not found; sup- posed to have been lost when house was re- modeled.			
		1		1				June 30, 1905	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		4		4				do	4
		1		1				do	1
		5		5				do	5
		2		2				do	2
		1		1				do	1
87	Dec. 28, 1904	1	1	2				do	2
87	do	1	1	2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		20		20				do	20
		2		2				do	2
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
88	Nov. 23, 1904		1	1				do	1
23	Jan. 24, 1905		24	24				do	24
38	Mar. 17, 1905		1	1				do	1
		4		4	4	Thrown away; broken.			
		8		8	8	Thrown away; worthless.			
23	Oct. 22, 1904		4	4	4	Thrown away; worn-out.			



2696 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Pantry—Continued.					
Cream, jugs, silver.....					
Private dining room.					
Curtains, velour, double face.....	pairs.....				
Covers, sideboard.....					
Goblets, cut glass.....	dozen.....				
Saucers, cut glass, champagne.....	do.....				
Glasses, cut glass, claret.....	do.....				
Glasses, cut glass, cordial.....	do.....				
Glasses, cut glass, punch, handled.....	do.....				
Plates, cut glass.....	do.....				
Finger bowl, cut glass.....	do.....				
Cup and saucer, tea.....	do.....				
Pitchers.....					
Tables, side, mahogany.....					
Cigar box, tin, square.....					
Fender, brass.....					
Fire set, tongs, poker, shovel, and stand.....					
Andirons, brass.....					
Clock, black marble.....					
Candelabra, high, bronze and gilt.....					
Figure, bronze, "Antelope".....					
Kettle, tea, brass.....					
Stand, brass, for kettle.....					
Vases, majolica.....					
Jardiniere, blue and white paintings of birds on side.....					
Jardiniere, Chinese.....					
Plate, Chinese.....					
Vase, yellow and white, with stand, English ware.....					
Pitcher, fancy, blue, Hungarian ware.....					
Dishes, meat, silver plated.....					
Plates, ice cream, cut glass.....	dozen.....				
Tablecloths, linen.....					
Napkins, linen.....	dozen.....				
Dollies, linen.....	do.....				
Tongs, sugar, silver.....	pair.....				
Screens.....					
Table, pine.....					
Salt cellars, glass.....					
Spoons, salt.....					
Dishes, meat.....					
Dishes, bonbon.....					
Knives, fruit.....					
Matting.....	yards.....				
Dishes, oatmeal.....					
Cups, egg.....					
Knives.....					
Urn, bouillon, silver plated.....					
Cloths, drawn work.....					
Baskets.....					
Sideboard, mahogany.....					
Table, mahogany extension.....					
Table, mahogany console.....					
Cabinet, mahogany, for china.....					
Mirror, mahogany and gold "colonial".....					
Chairs, mahogany and leather.....					
Chairs, mahogany with arms, leather upholstered.....					

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
.....	.....	2	.....	2	2	Used in cleaning silver. These were jugs of cream for clean- ing silver, not silver jugs for holding cream.	.....	.....	.....
.....	.....	2	.....	2	.....	.....	.....	June 30, 1905	2
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1½	.....	1½	.....	.....	.....	do	1½
.....	.....	1½	.....	1½	.....	.....	.....	do	1½
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1½	.....	1½	.....	.....	.....	do	1½
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	12	.....	12	12	6 transferred to storeroom; 6 thrown away, broken.	.....	.....	.....
.....	.....	2	.....	2	.....	.....	.....	June 30, 1905	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	5	.....	5	.....	.....	.....	do	5
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	12	.....	12	.....	.....	.....	do	12
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	12	.....	12	.....	.....	.....	do	12
.....	.....	46	.....	46	46	Thrown away; worn-out, worth- less.	.....	.....	.....
.....	.....	12	.....	12	.....	.....	.....	June 30, 1905	12
.....	.....	12	.....	12	.....	.....	.....	do	12
.....	.....	12	.....	12	.....	.....	.....	do	12
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	1	.....	1	.....	.....	.....	do	a 1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	10	.....	10	.....	.....	.....	do	10
.....	.....	2	.....	2	.....	.....	.....	do	2

a Poor.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Private dining room—Continued.					
Curtains, for windows.....pairs.....					
Rug, Yapræ, 15' 5" by 19' 9".....					
Mirror, French gold.....					
Table, mahogany, serving.....					
Folding screen, brass, for fireplace.....					
Screens, white silk.....					
Knives, pearl handles.....					
Pitchers, glass.....					
Lambrequin, mantel, covered with red damask.					
Pitchers.....					
Goblets, glass.....dozen.....					
Goblets.....do.....					
Ante or ushers' room.					
Water cooler.....					
Cabinet, key.....					
Rugs, Turkish, 1 large, 3 small.....					
Shade, white Holland.....					
Lambrequin, window.....					
Andirons, wrought iron.....pair.....					
Fender, wrought iron.....					
Fender, spark, Russian iron.....					
Vases, Holland, delft.....					
Painting, Rio de Janeiro Boy.....					
Brush, hair.....					
Comb.....					
Shade, Holland.....					
Button hook.....					
Shoehorn.....					
Desk, Flemish finish.....					
Rug, Ouchac.....					
Curtains, window, red flax velours lined with silk, interlined with flannel, trimmed with fringe, center tassels, cord loops with slides, carved walnut poles, pair.					
Chair, revolving, mahogany, No. 1072.....					
Desk, mahogany, No. 292.....					
Chairs, arm, mahogany, No. 482.....					
Chair, mahogany, No. 482.....					
Table, side, mahogany, No. 1487.....					
Stand for water cooler.....					
Seat, carved, Flemish oak.....					
Chairs, side, carved, Flemish oak.....					
Chair, arm, carved, Flemish oak.....					
Main vestibule.					
Shades, window, white Holland.....					
Chairs, arm, walnut, large.....					
Trays, card, silver.....					
Chairs, oak.....					
Mats, cocoa.....		Dec. 7, 1904		\$20.50	Dulin & Martin Co.
Carpet, Wilton, green.....					

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

[illegible]

2700 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Main vestibule—Continued.					
Matting .....yards..					
Desk, walnut .....					
Detector, watchman's .....					
Chairs, oak, high back .....					
Jardinieres, Istrian marble, white.....					
Zinc cases for same .....					
Lantern, electric, 12-light, antique, gold, glass panels, candelabra lamps.					
Standards, electric, 10-light, dark fire gilt, lily shades.					
Curtains, windows each side of north door, red velours lined with silk, interlined with double flannel, trimmed with rich fringe, silk center tassels, silk cord loop with slides, poles, pairs.					
Frame, gold .....					
Portrait, President Roosevelt .....					
Cotton damask for loose covers .....lot..					
Covers, loose.....					
East Room.					
Carpet, Wilton, old gold .....yards..					
Shades, window, white Holland.....					
Laces, Brussels.....pairs..					
Curtains, heavy satin damask .....					
Chairs, side, upholstered in satin damask .....					
Chairs, corner, upholstered in satin damask .....					
Chairs, arm, upholstered in satin damask .....					
Covers, loose .....					
Painting, President Washington.....					
Painting, President Jefferson .....					
Painting, President Lincoln .....					
Painting, Mrs. Martha Washington.....					
Carpet, Wilton, velvet.....yards..					
Matting, straw .....do.....					
Table top, white pine.....					
Crash, floor linen.....yards..					
Crash, to cover floor .....lot..					
Candelabra on mantels, 9 lights each, with marble bases, real candles, glass bobeches, dark fire gilt, pairs.					
Standards, electric, 12 lights, dark fire gilt, marble bases, candelabra lamps.					
Curtains for windows, made of damask, old gold color, lined with silk, interlined with molleton, front and bottom finished with fringe silk, center tassels, silk tassel loops, sets.					
Cornices, window, carved cherry wood and partly papier-maché, gilded, sets.					
Banquettes, 11 4' 6" by 1' 6", 2 2' 9" by 1' 6", richly carved, gilded, and glazed to an old effect, stuffed plain, covered with Bonton d'or colored velours de Genes, finished with gimp, loose colors of yellow figured linen.					
Tables, console, Louis XIV, gilded, marble tops.					
Andirons, Louis XIV, in gilt.....pairs..					
Dogs, iron.....sets..					
Fire tools, iron (poker and shovel to each), sets.					

APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2701

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		240		240	240	Worn-out in serv- ice; worthless.			
		1		1	1	In storehouse.		June 3', 1905	
		1		1				do	1
		4		4	4	Not found; sup- posed to have been lost when house was re- modeled.			
		2		2				June 30, 1905	2
		2		2				do	2
		1		1				do	1
		4		4				do	4
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		4		4				do	4
		476		476	476	Cut up and used in other rooms.			
		6		6				June 30, 1905	6
		3		3				do	3
		9		9				do	9
		12		12				do	12
		4		4				do	4
		8		8				do	8
		13		13				do	13
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		513½		513½	513½	Cut up and used in other rooms.			
		378		378	378	Worn-out in serv- ice; worthless.			
		1		1				June 30, 1905	1
		366		366	366	Used by painters to protect floors when painting.			
		1		1	1	do		June 30, 1905	4
		4		4				do	4
		4		4				do	4
		7		7				do	7
		7		7				do	7
		18		18				do	18
		4		4				do	4
		4		4				do	4
		2		2				do	2
		4		4				do	4

## Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
East Room—Continued.					
Stands, gilt, for fire tools.....					
Jardinieres, bisque, ram's-head handles.....					
Jardinieres, with raised Cupids and gold goat's-head handles.....					
Cotton damask, for loose covers.....lot..					
Awnings.....					
Lining, satin, for draperies.....yards..					
Pedestals, marble.....					
Green Parlor.					
Andirons.....pair..					
Covers, wall, cotton damask.....					
Laces, window, renaissance.....pairs..					
Piano, Knabe, concert grand.....					
Sofa, upholstered, green satin damask.....					
Chairs, arm, upholstered, green satin damask all over.....					
Chairs, upholstered, green satin damask all over.....					
Ottoman, upholstered, satin damask all over.....					
Seat, tête-à-tête, upholstered as above.....					
Stool, piano, upholstered.....					
Cabinet, carved, mahogany, tall.....					
Mirror, over mantelpiece, gilded wood, with United States shield over center at top.....					
Mirror on console table, gilded wood, with United States shield over center at top.....					
Cabinet stand and cabinet combined, about 8 feet high, Japanese or Chinese lacquered and ornamented in gilt.....					
Andirons, brass.....					
Fender, brass, low, open.....					
Fire screen, brass and green damask.....					
Fire screen, silk embroidered, United States coat of arms behind glass in black frame.....					
Stand, music, gilt, wood, presented by Austrian minister.....					
Statuette, bronze, Diane de Cables.....					
Clock, bronze and onyx.....					
Vase, pink crown derby.....					
Vase, yellow crown derby.....					
Vase, decorated in gold, of porcelain sèvres; no handle; picture of seaport, mountains in background, in foreground a peasant driving cattle, woman in red sitting on bench, child in blue and red standing by woman to the right.....					
Oil painting, portrait President Buchanan.....					
Oil painting, portrait President Jackson.....					
Oil painting, portrait President Van Buren.....					
Oil painting, portrait President Arthur.....					
Oil painting, portrait President Taylor.....					
Table, consolé, gilded wood, marble top under mirror.....					
Laces, Brussels, extra long.....pairs..					
Shade, window.....					
Chairs, antique.....					
Table, tea, mahogany.....					
Screen, black, 4-fold.....					
Cushions, antique.....					
Lamp, bronze.....					
Shade, lamp, pink lined.....					
Covers, loose.....					
Oil painting, portrait John Quincy Adams.....					
Oil painting, portrait Franklin Pierce.....					
Oil painting, portrait Andrew Johnson.....					



Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		4		4				June 30, 1905	4
		2		2				do	2
		2		2				do	2
		1		1				do	1
		3		3				do	3
		168		168				do	168
		2		2				do	2
		1		1				June 30, 1905	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		2		2				do	2
		3		3				do	3
		1		1	1	Not found; sup- posed to have been lost when house was re- modeled.			
		1		1	1	Sold at auction....	The President..		
		1		1				June 30, 1905	1
		1		1	1	Transferred store- house.			
		1		1				June 30, 1905	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1		Broken		do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		3		3				do	3
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		6		6				do	6
		1		1				do	1
		1		1				do	1
		1		1				do	1

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Green Parlor—Continued.					
Oil painting, portrait Wm. Henry Harrison .....					
Oil painting, portrait John Adams .....					
Oil painting, portrait Andrew Jackson .....					
Curtain poles .....					
Curtains, for windows; drapery decorations, pairs .....					
Sofa, in cotton, painted white .....					
Pillows, in cotton .....					
Chairs, arm, in cotton, painted .....					
Chairs, side, in cotton .....					
Chairs, light, cane seats .....					
Chairs, in silk, gilded .....					
Rug, India .....					
Screen, brass, folding .....					
Standards, solid brass, for use at receptions ..					
Blue Parlor.					
Andirons .....	pair.				
Cover, wall, cotton damask .....					
Curtains, lace, Renaissance .....	pairs.				
Chair, Ottoman, upholstered in blue damask.					
Ottomans, gilded-wood frames and legs, upholstered in blue damask.					
Covers, furniture .....					
Covers, wall .....					
Candelabra, 5 feet, gilded bronze, 12 branches in 2 horizontal planes of 6 each, 1 central branch, tripod bases.					
Clock, mantel, gilded bronze, longitudinal pedestal about 20" by 8" sides covered with bas-reliefs of Roman trophies. On the pedestal a seated female figure, probably Goddess of War or Victory; has a Roman helmet on her head and a wreath in left hand. Made by "Thomiere et Cie;" also marked at bottom of dial "Momer Aine."					
Candlesticks, mantel, gilded bronze, 2 feet high, probably companions of clock; square pedestals on 4 claw feet; winged female figures on two sides of pedestal, carrying wreath in one hand and trumpet or quill pen in other.					
Vases, dark blue Sevres, presented by President Faure, of France, to President McKinley.					
Pillows or cushions in blue satin damask .....					
Mirror on gilded wood, consolé table .....					
Vases, gilded, porcelain, each on a square base in two steps. Each has two handles, which are swans' necks and heads. One has picture of blind old man carrying youth on left arm, staff in right hand, helmet hanging from belt. The other has picture of blind old man and youth standing on rock overlooking sea; a lyre hangs from old man's back.					
Vase, corrugated white porcelain, overlaid with pond lilies of same. Base is gilded, marked Moore.					
Hangings, window, curtains, and draperies, blue silk reps., to match walls, curtains, finished front and bottom with embroidery. Draperies with embroidered stars and border lined with silk, interlined with molleton, finished with silk bullion fringe, silk tassel loops, silk center tassels.					

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Voucher		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.		
No.	Date.						
.....	.....	1	.....	1	.....	June 30, 1900	1
.....	.....	1	.....	1	.....	do	1
.....	.....	1	.....	1	.....	do	1
.....	.....	2	.....	2	.....	do	2
.....	.....	2	.....	2	.....	do	2
.....	.....	1	.....	1	.....	do	1
.....	.....	2	.....	2	.....	do	2
.....	.....	4	.....	4	.....	do	4
.....	.....	4	.....	4	.....	do	4
.....	.....	6	.....	6	.....	do	6
.....	.....	6	.....	6	.....	do	6
.....	.....	1	.....	1	.....	do	1
.....	.....	1	.....	1	.....	do	1
.....	.....	3	.....	3	.....	do	3
.....	.....	1	.....	1	.....	do	1
.....	.....	1	.....	1	.....	do	1
.....	.....	3	.....	3	3 Not found; sup- posed to have been lost when house was re- modeled.	.....	.....
.....	.....	1	.....	1	.....	June 30, 1905	1
.....	.....	2	.....	2	.....	do	2
.....	.....	30	.....	30	.....	do	30
.....	.....	15	.....	15	.....	do	15
.....	.....	2	.....	2	.....	do	2
.....	.....	1	.....	1	.....	do	1
.....	.....	2	.....	2	.....	do	2
.....	.....	2	.....	2	.....	do	2
.....	.....	4	.....	4	.....	do	4
.....	.....	1	.....	1	.....	do	1
.....	.....	2	.....	2	.....	do	2
.....	.....	1	.....	1	.....	do	1
.....	.....	3	.....	3	.....	do	3

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Blue Parlor—Continued.					
Window poles, richly carved wood, with carved eagles, gilded and glazed.	.....	.....	.....	.....	.....
Ventilators, Pullman, for windows.....	.....	.....	.....	.....	.....
Stanchions, bronze, for roping off space.....	.....	.....	.....	.....	.....
Sofa, richly carved, white and gold, covered with brocade trimmed gimp.	.....	.....	.....	.....	.....
Chairs, arm, finished as above.....	.....	.....	.....	.....	.....
Chairs, single, finished as above.....	.....	.....	.....	.....	.....
Chairs, small, finished as above.....	.....	.....	.....	.....	.....
Footstools, finished as above.....	.....	.....	.....	.....	.....
Cordon, to cut off the room, covered with gold silk velours.	.....	.....	.....	.....	.....
Screens, white silk.....	.....	.....	.....	.....	.....
Shades, white silk.....	.....	.....	.....	.....	.....
Screen, brass, folding, for fireplace.....	.....	.....	.....	.....	.....
Carpet, Wilton velvet, for use at receptions.....yards..	.....	.....	.....	.....	.....
Red Parlor.					
Cover, wall, cotton damask.....	.....	.....	.....	.....	.....
Matting, white china.....yards..	.....	.....	.....	.....	.....
Laces, window.....	.....	.....	.....	.....	.....
Screen, fire gilt, gilded wood surmounted by eagle, silk embroidered center, surrounded by 4 cat o' nine tails, showing fireplace in background, man sitting in center before a table carrying the Bible, man kneeling on his right, three females standing behind him, a male and a female servant standing on extreme right of picture.	.....	.....	.....	.....	.....
Screen, fire, brass, brass frame, damask center.	.....	.....	.....	.....	.....
Fire tools, steel, brass handles, 4 pieces..set..	.....	.....	.....	.....	.....
Vases (Faience) with ebony bases, about 4 feet high. One has painting of "Cupid in Prison," with Roman girl in front of door on one side, on other side a vase on a pedestal, with a fountain and Ionic portico in background. The other has on one side a Roman girl drinking at a tall fountain, 2 doves; on the other side a fluted pillar carrying a fountain bowl containing a dolphin, with a Corinthian portico in background.	.....	.....	.....	.....	.....
Stands for above, ebony.....	.....	.....	.....	.....	.....
Fender, brass.....	.....	.....	.....	.....	.....
Clock, gilt. On top a Roman sword and bowl of rings, at one side is a Roman warrior, etc.	.....	.....	.....	.....	.....
Vases, gilt, companion pieces to above clock.	.....	.....	.....	.....	.....
Candelabra, tall, bronze gilt, female figure standing on a globe. Five branches and one center branch; pedestals have bas-relief Roman trophy.	.....	.....	.....	.....	.....
Jardinier, green, marked on bottom "FF207"	.....	.....	.....	.....	.....
Vases, porcelain, magenta and gold bracket arms. Each has a picture of French revolutionary times.	.....	.....	.....	.....	.....
Ewer, green and gilt. Ewer has (2) Venus riding a dolphin and looking in a hand glass. (1) Venus riding a dolphin, three armors. (3) Armors, one with bow and arrow.	.....	.....	.....	.....	.....
Basin, has (1) Neptune riding the sea; (2) Venus riding a dolphin accompanied by a nymph.	.....	.....	.....	.....	.....
Bronze group, male figure seated on base of a broken pillar; female figure with face turned away; her right hand in right hand of the man, his left hand on her left shoulder, marked "Morcan."	.....	.....	.....	.....	.....

## Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.						Date.	Quantity.
		3		3			June 30, 1905	3
		2		2			do	2
		3		3			do	3
		1		1			do	1
		4		4			do	4
		4		4			do	4
		6		6			do	6
		4		4			do	4
		1		1			do	1
		40		40			do	40
		15		15			do	15
		1		1			do	1
		56		56			do	56
		1		1			June 30, 1905	1
		88		88	Worn-out in serv- ice. Worthless.			
		2		2	Transferred to storehouse.			
		1		1			June 30, 1905	1
		1		1			do	1
		1		1			do	1
		2		2			do	2
		2		2			do	2
		1		1			do	1
		1		1			do	1
		2		2			do	2
		1		1			do	1
		2		2			do	2
		1		1			do	1
		1		1			do	1
		1		1			do	1

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Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Red Parlor—Continued.					
Bronze figure, soldier seated, ancient armor, boar's or bear's hand helmet; left elbow resting on a casket on his left knee, marked "Rtion Sauvage."	.....	.....	.....	.....	.....
Bronze figure, ancient warrior seated bare-headed, battle-ax or scepter across knees.	.....	.....	.....	.....	.....
Settee, gilded wood, upholstered in red satin damask.	.....	.....	.....	.....	.....
Chairs, arm, rosewood, upholstered in red satin damask.	.....	.....	.....	.....	.....
Chairs, side, rosewood, upholstered in red satin damask.	.....	.....	.....	.....	.....
Chairs, arm, mahogany, upholstered in striped silk.	.....	.....	.....	.....	.....
Chairs, arm, gilded, wood, upholstered in red satin damask.	.....	.....	.....	.....	.....
Chairs, side, ditto as above	.....	.....	.....	.....	.....
Portrait, oil, President Polk	.....	.....	.....	.....	.....
Portrait, oil, President Tyler	.....	.....	.....	.....	.....
Portrait, oil, President Hayes	.....	.....	.....	.....	.....
Portrait, oil, President Harrison	.....	.....	.....	.....	.....
Portrait, oil, Mrs. Polk	.....	.....	.....	.....	.....
Portrait, oil, Mrs. Tyler	.....	.....	.....	.....	.....
Portrait, oil, Mrs. Van Buren	.....	.....	.....	.....	.....
Portrait, oil, Mrs. Hayes	.....	.....	.....	.....	.....
Portrait, oil, Mrs. Harrison	.....	.....	.....	.....	.....
Vase, white and gold, cactus in bloom	.....	.....	.....	.....	.....
Carpet, Wilton, velvet .....yards.	.....	.....	.....	.....	.....
Chair, antique	.....	.....	.....	.....	.....
Shade, silk	.....	.....	.....	.....	.....
Lamp, B and H	.....	.....	.....	.....	.....
Chair, rocking	.....	.....	.....	.....	.....
Globe, lamp	.....	.....	.....	.....	.....
Screen, 4-fold, black	.....	.....	.....	.....	.....
Pole, curtain, brass with rings	.....	.....	.....	.....	.....
Portrait, oil, President Zachary Taylor	.....	.....	.....	.....	.....
Portrait, oil, President James Monroe	.....	.....	.....	.....	.....
Portrait, oil, President Thomas Jefferson	.....	.....	.....	.....	.....
Portrait, oil, President James Madison	.....	.....	.....	.....	.....
Engraving, President Washington	.....	.....	.....	.....	.....
Portrait, President Washington	.....	.....	.....	.....	.....
Portrait, oil, President Grant	.....	.....	.....	.....	.....
Poles, curtain	.....	.....	.....	.....	.....
Rug, Kinnan, 14' 8" by 19'	.....	.....	.....	.....	.....
Curtains, for windows with drapery decorations, pairs.	.....	.....	.....	.....	.....
Sofas, stuffed all over, red silk	.....	.....	.....	.....	.....
Chairs, arm, stuffed all over, red silk	.....	.....	.....	.....	.....
Pillows, feather, covered with red silk, damask, trimmed with fringe, gimp, and rosettes.	.....	.....	.....	.....	.....
Chairs, stuffed all over, wooden rim, model Henry II, covered with red velours, ornamented with fringe, gimp, and effilé.	.....	.....	.....	.....	.....
Footstools, pillow-shaped, covered plain with red velours, ornamented with cord.	.....	.....	.....	.....	.....
Chairs, small, richly carved, white and gold, covered with brocade, trimmed with gimp.	.....	.....	.....	.....	.....
Andirons, gilt.....pairs.	.....	.....	.....	.....	.....
Screen, brass	.....	.....	.....	.....	.....
State dining room.					
Draperies, old gold damask.....pairs.	.....	.....	.....	.....	.....
Laces, Renaissance.....do	.....	.....	.....	.....	.....
Shades, white Holland	.....	.....	.....	.....	.....
Tables, side, walnut	.....	.....	.....	.....	.....
Chairs, mahogany, upholstered in leather	.....	.....	.....	.....	.....
Chairs, rosewood, upholstered in leather	.....	.....	.....	.....	.....





2710 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
State dining room—Continued.					
Table, breakfast, walnut.....					
Candelabra, gilt, 11 lights.....					
Stands, gilt, tall.....					
Holders, cut glass.....					
Group, bronze, pheasant with young.....					
Mirrors, gilt.....					
Plateau, in 7 pieces, gilt mirror frame.....					
Figures, gilt, women with wreaths.....					
Ornaments, gilt, used with plateau.....					
Pitchers.....					
Screens, window.....					
Table, dining, round, mahogany.....					
Chairs, arm, oak, carved, velvet cushions.....					
Chairs, high back, no arms, tapestry covered, mahogany.....					
Table, mahogany, extension, oblong shape, rounded corners.....					
Sideboard, long, mahogany, carved, eagle legs, marble top, brass trimmings.....					
Tables, serving, consolé, mahogany, carved eagle supports.....					
Curtains, for windows.....pairs,					
Head, stuffed, wild bison.....					
Head, stuffed, white Alaska sheep.....					
Head, stuffed, elk.....					
Head, stuffed, caribou.....					
Head, stuffed, antelope.....					
Head, stuffed, mountain sheep.....					
Head, stuffed, giant Alaska moose.....					
Head, stuffed, mountain lion.....					
Head, stuffed, grizzly bear.....					
Head, stuffed, Kadrup Island bear.....					
Tapestry, panel (north side).....					
Rug, plain green, 24 by 37 feet.....					
Screen.....					
Fixtures, fireplace, wrought iron, large.....					
Firedogs, iron.....pair.					
Fire set, iron.....					
Screen, metal, folding, finished black.....					
Holders, ramakin.....					
Cups, ramakin.....					
Carpet, Wilton velvet, for use at receptions, yards.....					
Covers, mounted heads, cotton damask.....		June 24, 1904	\$0.35	\$10.15	A. E. Kennedy..
Main corridor.					
Matting, white, China.....yards..					
Stands, flower, covered in red plush.....					
Pedestals, covered in red plush.....					
Pedestal, marble and plaster.....					
Bust, marble, President Fillmore.....					
Bust, marble, Hon. John Bright.....					
Bust, marble, Judge Hay.....					
Bust, marble, Unknown.....					
Bust, marble, Americus.....					
Jardinieres, majolica ware.....					
Portrait, oil, Grover Cleveland.....					
Covers, loose, cotton damask.....lot.					
Pedestal, plush covered.....					
Table, marble top, round.....					
Table, marble top, mahogany.....					
Stands, marble, high.....					
Covers, loose.....					
Shade, red silk, for lamp.....					

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		1		1				June 30, 1905	1
		4		4				do	4
		5		5				do	5
		32		32				do	32
		1		1				do	1
		2		2				do	2
		1		1				do	1
		16		16				do	16
		20		20				do	20
		2		2	2	Thrown away; broken.			
		3		3				June 30, 1905	3
		1		1				do	1
		6		6				do	6
		50		50				do	50
		1		1				do	1
		1		1				do	1
		2		2				do	2
		5		5				do	5
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		6		6				do	6
		24		24				do	24
		36		36				do	36
12	July 9, 1904		29	29				do	29
		312		312	312	Worn-out in serv- ice; worthless.		June 30, 1905	
		2		2	2	Not found; sup- posed to have been lost when house was re- modeled.		do	
		4		4				do	4
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		10		10				do	10
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		8		8				do	8
		1		1	1	Burned in service; worthless.		do	

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Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Main corridor—Continued.					
Cabinets, mahogany.....					
Jardinieres, Chinese.....					
Screen, mahogany, 5-fold.....					
Screens, mahogany, small.....					
Chairs, mahogany, arm, upholstered.....					
Chair, arm.....					
Stands, flower, wooden, stained.....					
Urns, brass.....					
Rocker, mahogany, high back.....					
Engraving, President Garfield.....					
Rug, plain red, 12' by 73'.....					
Standards, electric, 10 lights, dark fire gilt, lily shades.....					
Banquettes, richly carved French walnut, stuffed, plain, covered with red silk velours, finished with gimp and large nails; loose covers of red linen.....					
Curtains, East Room and State dining-room doors, red velours, lined with silk, interlined with double flannel, trimmed with fringe, rich, silk center tassels, silk cord loops with slides, poles, pairs.....					
South portico.					
Rug, carpet, velvet.....					
Awning, reed.....					
Awnings, window.....					
Curtains, drop canvas.....					
Chair, reclining.....					
Shade, lawn, with platform.....					
Awnings, lined with denim.....					
Awnings, roll, lined with denim.....					
Awnings, stationary, lined with denim.....					
North portico.					
Lantern, electric, 18 lights, fire gilt, glass panels.....					
Trees, bay.....pairs.....					
BASEMENT.					
Steward's room.					
Carpet, Wilton, brown.....yards.....					
Matting, white, china.....do.....					
Shades, gray holland.....					
Desk, small, walnut.....					
Table, walnut, with drawer.....					
Washstand, walnut.....					
Table, walnut, small.....					
Chair, office, revolving.....					
Chair, oak, cane seat.....					
Table, oak, extension.....					
Safe, office, Farrell, Herring & Co.....					
Holders, candle, patent, plated.....					
Boxes for candleholders.....					
Box, shoe blacking, walnut.....					
Pillow, leather.....					
Basket, waste paper.....					
Chair, low, walnut.....					
Clock, regulator, 8-day, mahogany.....					
Clock, cherry, 8-day.....					
Rugs, camel's hair.....					
Bobashers, glass.....					
Shades, paper, red and silver.....					
Shades, paper, pink and silver.....					
Shades, paper, yellow and silver.....					

Inventory of public property, Executive Mansion, June 30, 1906—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	On hand last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		2		2		Burned at place where stored.		June 30, 1906	.....
		4		4				do	4
		1		1				do	1
		2		2				do	2
		4		4				do	4
		1		1				do	1
		2		2				do	2
		2		2				do	2
		1		1	1	Transferred to at- tic; broken.		do	.....
		1		1				do	1
		1		1				do	1
		6		6				do	6
		12		12				do	12
		2		2				do	2
		1		1				June 30, 1906	1
		1		1				do	1
		10		10				do	10
		2		2				do	2
		1		1				do	1
		1		1				do	1
		5		5				do	5
		8		8				do	8
		4		4				do	4
		1		1				June 30, 1906	1
		2		2				do	2
		88		88				June 30, 1906.	88
		88		88				do	88
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		120		120				do	120
		10		10				do	10
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		64		64				do	64
		98		98				do	98
		100		100				do	100
		20		20				do	20

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Steward's room—Continued.					
Shades, silk, red .....					
Shades, silk, yellow .....					
Shades, silk, pink .....					
Cover, piano, blue .....					
Cover, piano, linen .....					
Tub, foot, china, toilet .....					
Toilet set, china .....	pieces				
Plates, fish, Hayes set .....					
Plates, salad, Hayes set .....					
Plates, oyster, Hayes set .....					
Plates, game, Hayes set .....					
Plates, dinner, Hayes set .....					
Plates, soup, Hayes set .....					
Clock, brass, out of order .....					
Saucers, coffee, Hayes set .....					
Cups, coffee, Hayes set .....					
Cups, coffee, after-dinner, Hayes set .....					
Saucers, coffee, after-dinner, Hayes' set .....					
Plates, dinner, Lincoln set .....					
Plates, soup, Lincoln set .....					
Plates, soup, small, Lincoln set .....					
Plates, breakfast, Lincoln set .....					
Plates, bread and butter, Lincoln set .....					
Plates, small, Haviland, odd .....					
Plates, ice cream, Haviland, pink .....					
Plates, soup, small, white china .....					
Plates, tea, white china .....					
Plates, butter, individual, odd .....					
Curtains, creton .....	pair				
Pyramid, tin .....					
Trunks for storing silver .....					
Buckets, water, galvanized .....					
Box, walnut, for storing silver .....					
Trays, walnut .....					
Trays, serving, wooden .....					
Funnels, tin .....					
Washboard .....					
Castors, old .....	lot				
Rat trap, wire .....					
Bed, walnut, single, folding .....					
Carriers, tin, hot-water .....					
Keyboard .....					
Can, water .....					
Curtains, lace, Brussels .....	pair				
Refrigerator, oak (cold storage) .....					
Chairs, horn, upholstered .....					
Box, tin, for sugar, capacity 50 pounds .....					
Stove, coaloil, No. 4 .....					
Trays, japanned, large .....					
Trunks containing silver (6 in all).					
1. Marked M. le Baron de Tuyll, wooden trunk, covered with leather, bound with iron.					
2. Wooden trunk, covered with leather, iron bound, brass plate marked "No. 2 M. le Baron de Tuyll."					
3. Leather-covered trunk, bound with iron; has brass plate marked "Baron de Tuyll."					
4. Oak trunk, bound with iron; brass plate marked "James Monroe."					
5. Canvas-covered trunk, bound with iron, marked "President's House."					
6. Trunk covered with black leather and bound with iron.					

# APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2715

Inventory of public property, Executive Mansion, June 30, 1906—Continued.

					Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
								Date.	Quantity.
		125		125	1	Destroyed by fire.		June 30, 1906	122
		130		130	2	do		do	128
		121		121		do		do	121
		1		1		do		do	1
		1		1		do		do	1
		1		1		do		do	1
		7		7	1	Pitcher; thrown away.		do	64
		38		38		do		do	38
		34		34		do		do	34
		37		37	15	Not found		do	22
		7		7		do		do	7
		24		24		do		do	24
		5		5		do		do	5
		1		1		do		do	1
		23		23		do		do	23
		2		2		do		do	2
		4		4		do		do	4
		28		28		do		do	28
		55		55	30	Transferred to Historical Society.		do	25
		14		14		do		do	14
		6		6		do		do	6
		10		10		do		do	10
		2		2		do		do	2
		45		45		do		do	45
		6		6		do		do	6
		6		6		do		do	6
		13		13		do		do	13
		12		12		do		do	12
		1		1		do		do	1
		1		1		do		do	1
		6		6		do		do	6
		2		2		Worn		do	2
		1		1		do		do	1
		3		3		do		do	3
		2		2		do		do	2
		3		3		do		do	3
		1		1		do		do	1
		1		1	1	Not found; supposed to have been lost when house was remodeled.		do	
						do		do	
		1		1	1	do		do	
		1		1		do		do	1
		3		3		do		do	3
		1		1		do		do	1
		1		1		do		do	1
		1		1		do		do	1
		1		1		do		do	1
		2		2		do		do	2
		1		1		do		do	1
		1		1	1	Sold at auction	The President	do	
		5		5		do		do	5
		1		1				June 30, 1906	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1

\*Two broken; 4 good.

b Chipped.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Trunks containing silver—Continued.					
Tureen, soup, stand, inside and top. Made in France by Christopher. The mark on this silver was first used in 1797. All the silver is marked "President's House."					
Platter, large fancy border ...	} French plate				
Platter, medium fancy border ...					
Plate, fancy border .....					
Plates, thread border.....					
Chocolate pot, thread border.....	} Silver				
Caster, wine, thread border.....					
Casters, salt, for 2 cellars, French plate.....					
Dishes, vegetable, round, with handles.....					
Casters, wine, fancy border.....					
Sifter, sugar, thread pattern .....					
Spoons, ice cream.....					
Forks, breakfast, beaded pattern, silver. They were made under Cleveland's second Administration from 84 silver forks and 57 gilt forks that were worn down. These forks were taken to the Treasury Department, weighed, and melted. The silver was then sent to the silversmith's and 96 breakfast and 96 dinner forks made.					
Spoons, tea, thread pattern, silver.....					
Knives, fruit, pearl handles, with gilt shield in handle. Gilt.					
Spoon, mustard, without handle. Gilt.....					
Trays, scalloped edge, English plate.....					
Plates, fancy border; made by Christopher. His mark was first used in 1797. French plate.					
Platters, French plate, made by Christopher; thread pattern.					
Mug and stand, sirup, plated, marked "President's House."					
Caster, egg, 6 cups and 6 spoons .....					
Casters, wine, silver handle, openwork .....					
Casters, wine, silver .....					
Caster, wine, plated, will hold 3 decanters.....					
Skewers, attelètes, 3 eagle and 3 squirrel tops.					
Baking shells, shaped like scalloped shells, plated.					
Cheese scoop, celluloid handle, plated .....					
Knives, pearl handles, English plated.....					
Knives, celluloid handles, plated .....					
Dishes, pudding, with rings .....					
Serving trays, fancy border, openwork, Gorham plate.					
Pans, crumb, plated, thread border.....					
Scrapers, crumb, plated, thread border.....					
Holders, boquet, leaf pattern, made by Meriden Britannia Co.					
Platters, beaded pattern, Gorham plate .....					
Baskets, cake, without handles, English plate.					
Buckets, ice, with handles .....					
Bell, with black marble .....					
Spoons, table, thread border, silver .....					
Forks, dinner, silver, beaded border .....					
Forks, breakfast, silver, beaded border.....					
Forks, oyster, silver, plain handle.....					
Forks, oyster, silver .....					
Sugar sifter, silver, thread pattern; Christopher.					
Scissors, grape, silver .....	pairs.				
Forks, salad, beaded pattern, silver .....					
Spoons, salad, beaded pattern, silver .....					
Spoons, tea, thread pattern. These were originally gilt French silver.					
Spoons, tea, thread pattern, silver.....					



APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2717

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
.....	.....	1	.....	1	.....	.....	.....	June 30, 1905	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	5	.....	.....	.....	do	5
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	5	.....	1	.....	.....	.....	do	1
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	9	.....	9	.....	.....	.....	do	9
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	95	.....	95	.....	.....	.....	do	95
.....	.....	47	.....	47	.....	.....	.....	do	47
.....	.....	47	.....	47	.....	.....	.....	do	47
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	19	.....	19	.....	.....	.....	do	19
.....	.....	8	.....	8	.....	.....	.....	do	8
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	88	.....	88	.....	.....	.....	do	88
.....	.....	108	.....	108	.....	.....	.....	do	108
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	26	.....	26	.....	.....	.....	do	26
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	92	.....	92	.....	.....	.....	do	92
.....	.....	84	.....	84	.....	.....	.....	do	84
.....	.....	72	.....	72	.....	.....	.....	do	72
.....	.....	69	.....	69	.....	.....	.....	do	69
.....	.....	12	.....	12	.....	.....	.....	do	12
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	4	.....	4	.....	.....	.....	do	4
.....	.....	36	.....	36	.....	.....	.....	do	36
.....	.....	53	.....	53	.....	.....	.....	do	53

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Trunks containing silver—Continued.					
Spoons, after dinner, coffee, thread pattern.....					
Spoons, berry, fancy border, silver.....					
Spoons, salad, thread pattern, silver.....					
Forks, salad, thread pattern, silver.....					
Rings, napkin, Nos. 1 to 6.....					
Mustard pots, French silver, made by Christopher.					
Dishes, round, vegetable, with handles, silver.					
Cigar lighter, low, silver.....					
Cigar lighter, high, buckhorn handle, silver.					
Cruets, pepper, 8 for black and 3 for red pepper, tall, silver.					
Forks, asparagus, combination, silver.....					
Scraper, crumb, thread pattern, silver.....					
Fork and spoon combined, silver, for salad ..					
Knives, butter, thread pattern.....					
Extinguisher, candle, silver.....					
Porcupine, silver, for toothpicks.....					
Spoons, ice cream, fancy pattern handle.....					
Ship, silver, "Hiawatha".....					
Lake for ship, silver.....					
Spoons, dessert, thread pattern, French gilt..					
Spoons, dessert, thread pattern, gilt.....					
Strainer, tea.....					
Spoons, mustard, gilt, thread pattern.....					
Spoon, mustard, gilt, very slender.....					
Bowls, salad, silver, fancy borders.....					
Bowls, salad, silver, Gorham beaded pattern.					
Dishes, olive, silver, fancy border.....					
Candelabra, silver, 5 lights.....					
Bowls, sugar, one has a top.....					
Pitcher, cream, French silver, tall.....					
Pitcher, cream, silver, thread border.....					
Tea set, 4 pieces, for tray.....					
Compotes, silver, fancy border.....					
Coffeepots, French silver, ivory handles.....					
Teapot, French silver, ivory handle.....					
Teapot, silver, ebony handle.....					
Sauce boats, thread border, silver.....					
Stands, thread border, silver.....					
Tongs, sugar, silver, thread pattern.....					
Ladles, sauce, silver, thread pattern.....					
Ladles, sauce, silver, beaded pattern.....					
Ladles, soup, silver, thread pattern.....					
Knife, pie, silver, beaded pattern.....					
Dishes, bonbon, silver, Gorham, fancy border.					
Dishes, bonbon, silver, Gorham, openwork border.					
Dishes, bonbon, gilt, fancy border.....					
Spoons, serving, French silver, thread border.					
Kettle and stand, tea, silver, with eagle, ornamental handle; kettle is made to tip.					
Compotes, silver, fancy border, openwork....					
Toast rack, silver.....					
Toast rack, silver plated.....					
Tureen, soup, stand, inside and top marked "President's House."					
Platter, French plated, large, fancy border..					
Platters, French plated, medium, thread border.					
Plates, French plated.....					
Pitcher, cream, silver, ivory handle.....					
Pot, hot water, silver, ivory handle.....					
Caster, wine, silver, thread border, for two decanters.					
Casters, salt, French plated, for two cellars each.					
Knives, fruit, gilt.....					
Sifter, sugar, gilt, thread pattern.....					
Spoons, berry, gilt, thread pattern.....					
Forks, dinner, silver, beaded.....					

## APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2719

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		83		83				June 30, 1905	83
		2		2				do	2
		2		2				do	2
		2		2				do	2
		6		6				do	6
		2		2				do	2
		2		2				do	2
		1		1				do	1
		1		1				do	1
		12		12				do	12
		2		2				do	2
		1		1				do	1
		1		1				do	1
		8		8				do	8
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		57		57				do	57
		22		22				do	22
		1		1				do	1
		8		8				do	8
		1		1				do	1
		2		2				do	2
		4		4				do	4
		2		2				do	2
		4		4				do	4
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		6		6				do	6
		2		2				do	2
		1		1				do	1
		4		4				do	4
		4		4				do	4
		2		2				do	2
		5		5				do	5
		2		2				do	2
		8		8				do	8
		1		1				do	1
		12		12				do	12
		12		12				do	12
		12		12				do	12
		8		8				do	8
		1		1				do	1
		4		4				do	4
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		5		5				do	5
		1		1				do	1
		1		1				do	1
		1		1				do	1
		4		4				do	4
		48		48				do	48
		1		1				do	1
		2		2				do	2
		95		95				do	95

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description. )	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Trunks containing silver—Continued.					
Dishes, vegetable, silver, round, with handle on the side.					
Casters, wine, silver, fancy border.					
Spoons, salt, gilt, thread pattern					
Casters, wine, silver, fancy borders, with tops.					
Tureens, soup, silver; 3 parts each, stand, inside, and top; top has eagle ornament for handle.					
Silver-plated ware.					
Spoons, table.					
Spoons, tea, German silver.					
Spoons, tea, stamped "President's House"					
Forks, stamped "President's House"					
Knives, ivory handles					
Knives, plated					
Trays, with handles, large English plate, marked "President's House."					
Candelabra, 5 lights, Gorham plate.					
Candelabra, 5 lights.					
Pot, coffee, international					
Dishes, butter.					
Casters, wine.					
Casters, table.					
Dish, chafing.					
Pitchers, water					
Pitchers, water, fancy border.					
Pitchers, water, large, plain					
Trays, for pitchers					
Trays, for pitchers, fancy border					
Tea set, for tray, plain					
Stand, tall, for bouquet holder.					
Candlestick, plain					
Holdern, ramakin.					
Nutcrackers.					
Lamps, spirit.					
Nut pickers, pearl handles					
Nut pickers, plated					
Urn, capacity 3 quarts, coffee					
Holdern, bottles.		Dec. 9, 1904	\$8. 00	\$48. 00	Harris & Schafer Co.
Glassware.					
Vases, glass					
Bowls, finger.	Coat of arms.				
Plates, ice cream.					
Glasses, sherry, stem.					
Glasses, claret					
Bowls, champagne					
Tumblers, champagne.					
Glasses, Burgundy					
Goblets					
Plates, ice cream.					
Decanters.					
Saltcellars					
Bottles, water.					
Dish, celery, flat					
Glasses, punch		May 11, 1905		4. 90	Dulin & Martin Co.
Dishes, berry, oblong					
Bowls, rose					
Bowl.					
Dishes, berry					
Dishes, olive, with handles.					
Dishes, olive, without handles.					
Dishes, olive					
Bottles, water.					
Glasses, Sauterne, green					
Glasses, Sauterne, green					
Glasses, Burgundy, ruby					

# APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2791

Inventory of public property, Executive Mansion, June 30, 1906—Continued.

Voucher.		On hand last re- turn.	Received since				
No.	Date.						
		2				do	2
		11					
		10					
		4					
		2		2			
		32		32		do	32
		8		8		do	8
		291		291	III	Lost at receptions	291
		300		300		do	300
		88		88		do	88
		19		19		do	19
		2		2		do	2
		10		10		do	10
		2		2		do	2
		1		1		do	1
		2		2		do	2
		3		3		do	3
		3		3		do	3
		1		1		do	1
		3		3		do	3
		3		3		do	3
		2		2		do	2
		6		6		do	6
		8		8		do	8
		1		1		do	1
		1		1		do	1
		1		1		do	1
		24		24		do	24
		15		15		do	15
		4		4		do	4
		5		5		do	5
		11		11		do	11
		1		1		do	1
58	Mar. 24, 1905	6	6	6		do	6
		10		10		June 30, 1905	10
		82		82		do	82
		70		70		do	70
		83		83		do	83
		92		92		do	92
		89		89		do	89
		65		65		do	65
		77		77		do	77
		91		91		do	91
		12		12		do	12
		7		7		do	7
		24		24		do	24
		26		26		do	26
		1		1		do	1
80	June 20, 1905	89	84	173		do	173
		6		6		do	6
		2		2		do	2
		1		1		do	1
		6		6		do	6
		7		7		do	7
		2		2		do	2
		18		18		do	18
		40		40		do	40
		84		84		do	84
		12		12		do	12
		63		63		do	63

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Glassware—Continued.					
Glasses, Burgundy, ruby.....					
Glasses, liqueur.....					
Bowls, finger.....					
Dishes, sauce.....					
Plates, ice cream.....					
Bowls, sugar.....					
Glasses, sherry.....					
Glasses, Rhine wine.....					
Glasses, claret.....					
Glasses, punch, tall, with handles.....					
Glasses, celery.....					
Decanters, tall.....					
Stoppers, cut glass.....					
Glasses, Madeira, ruby.....					
Glasses, port.....					
Glasses, liqueur, engraved, Roman border, old.....					
Glasses, sherry, engraved, Roman border, old.....					
Glasses, champagne, engraved, Roman border, old.....					
Glasses, sherry, engraved with vine, odd.....					
Glasses, liqueur stem, engraved with vine, odd.....					
Glasses, sauterne, engraved with vine, odd.....					
Glasses, white wine, engraved with vine, odd.....					
Glasses, claret, engraved with vine, odd.....					
Glasses, Rhine wine, engraved with vine, odd.....					
Glasses, Burgundy, engraved with vine, odd.....					
Glasses, claret, engraved with vine, odd.....					
Bowls, finger, engraved with vine, odd.....					
Bottles, water, engraved with vine, odd.....					
Dishes, berry, engraved with vine, odd.....					
Decanters, with handles, engraved with vine, odd.....					
Decanters, engraved with vine, odd.....					
Bottle, water, cut glass.....					
Glasses, cocktail, engraved with star.....					
Glasses, Roman punch.....					
Glasses, Madeira, engraved Roman border.....					
Glasses, claret, engraved Roman border.....					
Glasses, Burgundy, engraved Roman border.....					
Romers, engraved, vine border.....					
Bowls, large, used with gilt plateau in state dining room.....					
Dishes, bon-bon, iridescent.....					
Stands, cake, high.....					
Dishes, berry, high.....					
Dishes, celery, engraved vine border.....					
Decanters, with handles.....					
Vases.....					
Salt cellars, individual.....					
Tumblers.....dozen.....					
Goblets.....		Dec. 28, 1904	\$2.00	\$12.00	Dulin & Martin Co.
Chinaware.					
Teapots.....					
Toilet sets.....					
Cups.....dozen.....		Nov. 17, 1904		8.25	Dulin & Martin Co.
Saucers.....		do		8.25	do
Ewers, china.....					
Basins, china.....					
Dishes, soap.....					
Bowl.....					
Mugs.....		Oct. 3, 1904		.87	Dulin & Martin Co.
Vases.....					
Chambers, china.....					
Jars, slop.....					
Dish, butter.....					
Bowls, oatmeal.....					
Platters.....					

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		24		24				June 30, 1902	24
		19		19				do	19
		21		21				do	21
		51		51				do	51
		11		11				do	11
		2		2				do	2
		52		52				do	52
		7		7				do	7
		28		28				do	28
		25		25				do	25
		4		4				do	4
		17		17				do	17
		10		10				do	10
		54		54				do	54
		63		63				do	63
		19		19				do	19
		64		64				do	64
		37		37				do	37
		16		16				do	16
		26		26				do	26
		42		42				do	42
		64		64				do	64
		54		54				do	54
		4		4				do	4
		27		27				do	27
		17		17				do	17
		35		35				do	35
		23		23				do	23
		8		8				do	8
		6		6				do	6
		6		6				do	6
		1		1		Broken		do	1
		18		18				do	18
		20		20				do	20
		71		71				do	71
		14		14				do	14
		31		31				do	31
		20		20				do	20
		2		2				do	2
		24		24				do	24
		3		3				do	3
		3		3				do	3
		3		3				do	3
		3		3				do	3
		4		4				do	4
		11		11				do	11
		18½		18½				do	18½
22	Jan. 24, 1905		72	72	72	Thrown away; bro- ken in service.			
		2		2				June 30, 1905	2
		3		3				do	3
37	Dec. 28, 1904	2	½	2½				do	2½
37	do	2	½	2½				do	2½
		3		3				do	3
		2		2				do	2
		7		7				do	7
		1		1				do	1
38	Nov. 23, 1904	3	3	6	3	Thrown away; bro- ken in service.		do	3
		2		2				do	2
		6		6				do	6
		2		2				do	2
		1		1				do	1
		12		12	6	Thrown away; bro- ken in service.		do	6
		6		6	2	do		do	4



Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
China ware—Continued.					
Dishes, vegetable .....					
Bowls .....		Nov. 11, 1904	\$1.00	\$6.00	Dulin & Martin
Pitchers, water .....		May 22, 1905	8.50	7.00	Co. do .....
[Lincoln set.]					
Plates, soup .....					
Plates, dinner .....					
Plates, breakfast .....					
Platters, fish .....	} red border, with eagle in center {				
Plate, bread .....					
Pitchers .....					
Compotes .....					
Stands, cake .....					
Stands, pyramid .....					
Stands, fruit .....					
Bowls, punch .....					
Platters .....					
[Grant set.]					
Plates, soup; yellow border .....					
Plates, dinner; flowers painted in center .....					
Stands, cake .....					
Stands, fruit .....					
Compotes .....					
Plates, soup; plain yellow band .....					
Platters, meat .....					
Platters, fish .....					
Plates, soup .....					
Plates, soup, small; yellow, with flowers .....					
Plates, dinner; painted in center .....					
[Hayes set.]					
Plates, soup; decorated by Theo. Davis .....					
Plates, dinner; decorated by Theo. Davis .....					
Plates, oyster; decorated by Theo. Davis .....					
Plates, game; decorated by Theo. Davis .....					
Plates, fish; decorated by Theo. Davis .....					
Plates, cracker and cheese; decorated .....					
Plates, punch .....					
Plates, dessert .....					
Plates, salad .....					
Dishes, gravy boats .....					
Platter, fish .....					
Platters, game; ornamented with picture of canvasback duck .....					
Platters, meat; turkey decorations .....					
Platters, ice cream; ornamented with picture of snowshoe .....					
Cups and saucers, coffee; odd shape .....					
Cups, coffee; after-dinner .....					
[Arthur set.]					
Plates, dessert, odd .....					
Cups and saucers, Dresden, small .....					
Plate, dessert .....					
[Cleveland set.]					
Plates, dessert, turquoise .....					
Plates, dessert, ivory and gold .....					
Plates, dessert, odd .....					
Plates, dessert, scalloped edge, blue .....					
Plates, dinner, blue border .....					
Plates, dinner, red and gold .....					
Plates, dinner, pink and gold border .....					
Plates, breakfast, green and gold .....					
Platter, ice cream, pink and gold .....					
Plates, ice cream, pink and gold .....					
Dishes, bon-bon, flags of nations .....					

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last ret. urn.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		12	....	12	4	Thrown away; bro- ken in service.		June 30, 1905	8
37	Dec. 28, 1904	2	6	8	4	do		do	4
33	June 20, 1905	....	2	2				do	2
		6	....	6				June 30, 1905	6
		56	....	56				do	56
		37	....	37				do	37
		6	....	6				do	6
		1	....	1				do	1
		4	....	4				do	4
		16	....	16				do	16
		12	....	12				do	12
		8	....	8				do	8
		9	....	9				do	9
		2	....	2				do	2
		7	....	7				do	7
		10	....	10				June 30, 1905	10
		3	....	3				do	3
		5	....	5				do	5
		5	....	5				do	5
		8	....	8				do	8
		20	....	20				do	20
		4	....	4				do	4
		1	....	1				do	1
		8	....	8				do	8
		13	....	13				do	13
		29	....	29				do	29
		25	....	25				June 30, 1905	25
		59	....	59				do	59
		48	....	48				do	48
		32	....	32				do	32
		6	....	6				do	6
		50	....	50				do	50
		36	....	36				do	36
		70	....	70				do	70
		7	....	7				do	7
		2	....	2				do	2
		1	....	1				do	1
		2	....	2				do	2
		2	....	2				do	2
		2	....	2				do	2
		8	....	8				do	8
		17	....	17				do	17
		25	....	25	3	Broken		June 30, 1905	25
		5	....	5				do	5
		1	....	1				do	1
		95	....	95				June 30, 1905	95
		18	....	18				do	18
		13	....	13				do	13
		11	....	11	2	Broken in service		do	11
		84	....	84				do	84
		84	....	84	1	Broken in service		do	84
		95	....	95	2	do		do	95
		96	....	96	4	do		do	96
		1	....	1				do	1
		3	....	3				do	3
		18	....	18	3	Broken in service		do	18

## 2726 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
China ware—Continued.					
[Cleveland set—Continued.]					
Plates, breakfast, rolled edge.....					
Cups, tea.....					
Saucers, tea.....					
Cups, after-dinner.....					
Saucers, after-dinner.....					
Plates, Haviland, odd.....					
Plate, deep, red, dinner.....					
Plates, rolled edge.....					
[Harrison set.]					
Plates, soup.....					
Plates, dinner.....					
Plates, breakfast.....					
Plates, bread and butter.....					
Plates, dinner.....					
Plates, breakfast.....					
[McKinley set.]					
Plates, oyster.....					
Plates, dessert, rose border.....					
Plates, breakfast, green and gold border.....					
Plates, breakfast, blue and garland of roses.....					
Plates, butter, individual.....					
Cups, coffee, white and green.....					
Saucers, coffee, white and green.....					
Bowls, blue and white.....					
Pitchers, blue and white.....					
Soup, deep, red border.....					
Pitcher, small, blue.....					
Jar, cracker, Haviland.....					
Ornament, China "Hen on nest".....					
Bowl, punch, high stand, blue and white.....					
Ash receiver, shell, imitation.....					
Ramakins, French china.....					
Cups, tea, odd, Haviland.....					
Cups and saucers, coffee, green and gold border.....					
Cups and saucers, large, colored bowl.....					
Cups, tea, colored bowl.....					
Cups, after-dinner coffee.....					
Plate, tea, deep red border.....					
Plate, breakfast, deep red border.....					
Plate, dinner, deep red border.....					
Plates, soup, narrow yellow border.....					
Plate, dinner, narrow yellow border.....					
Cups, odd sizes.....					
Saucers, odd sizes.....					
[Roosevelt set.]					
Plates, dinner.....dozen..					
Plates, breakfast.....do..					
Plates, fish.....do..					
Plates, tea.....do..					
Plates, soup.....do..					
Plates, bread and butter.....do..					
Cups and saucers, after-dinner coffee.....do..					
Cups and saucers, tea.....do..					
Plates, oyster.....do..					
Dishes, 16-inch.....					
Dishes, 18-inch.....					
Cups, bouillon.....					
Saucers, bouillon.....					
Linen.					
Pillows.....					
Dollies.....					
Tablecloths, 10½ yards long, embroidered "U. S.".....					

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		393		393	10	Broken in service		June 30, 1905	393
		191		191				do	191
		190		190				do	190
		190		190	12	Broken in service		do	190
		193		193				do	193
		3		3				do	3
		1		1				do	1
		3		3				do	3
		92		92				June 30, 1905	92
		80		80				do	80
		70		70				do	70
		55		55				do	55
		15		15				do	15
		26		26				do	26
		24		24				June 30, 1905	24
		24		24	8	Broken and chipped		do	24
		24		24				do	24
		12		12				do	12
		22		22	15	Broken and chipped		do	22
		5		5				do	5
		11		11				do	11
		6		6	1	Broken and chipped		do	6
		2		2				do	2
		9		9				do	9
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		6		6				do	6
		24		24				do	24
		14		14				do	14
		15		15				do	15
		2		2				do	2
		5		5				do	5
		9		9				do	9
		1		1				do	1
		1		1				do	1
		1		1				do	1
		17		17				do	17
		1		1				do	1
		18		18				do	18
		41		41				do	41
		15		15	1	Broken in service		June 30, 1905	15
		10		10	1	do		do	10
		10		10				do	10
		10		10				do	10
		10		10				do	10
		5		5				do	5
		8		8	4	Broken in service		do	8
		10		10	2	do		do	10
		10		10				do	10
		12		12				do	12
		12		12				do	12
		41		41				do	41
		41		41				do	41
		6		6				June 30, 1905	6
		18		18				do	18
		3		3				do	3

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Linen—Continued.					
Tablecloth, 5 yards long .....					
Tablecloth, 9 yards long .....					
Tablecloth, 6½ yards long .....					
Tablecloth, 5½ yards long .....					
Tablecloth, 4 by 8 yards .....					
Tablecloth, 7 yards long .....					
Tablecloth, 4½ yards long .....					
Tablecloth, 8 by 8 yards .....					
Tablecloth, 8 by 3 yards, embroidered "U. S." .....					
Tablecloth, 4 yards long .....					
Tablecloth, 2½ yards long; servants' .....					
Tablecloth, 1½ yards long; servants' .....					
Tablecloths, 1½ yards long; cut down from long cloths. ....					
Covers, sideboard; hemstitched, embroidered "U. S.;" old. ....					
Covers, sideboard, fringed .....					
Napkins, fringed .....					
Doilies, embroidered "U. S." .....					
Cloth, tray, hemstitched; embroidered "U. S." .....					
Napkins, 28½ by 36 inches .....					
Napkins, large; embroidered "U. S." .....					
Napkins, large; embroidered "U. S." in red .....					
Napkins, breakfast; embroidered "U. S." in red .....					
Napkins, poppy pattern; embroidered "U. S." in red. ....					
Napkins, fern pattern; embroidered "U. S." in red. ....					
Napkins, fancy border; embroidered "U. S." in red. ....					
Napkins, flower border; embroidered "U. S." in red. ....					
Napkins, ribbon border; embroidered "U. S." in red. ....					
Doilies, Renaissance; open center .....					
Centerpieces, Renaissance .....					
Doilies, large, German .....					
Doilies, medium, German .....					
Centerpieces .....					
Centerpiece, 1½ yards square; Renaissance .....					
Centerpiece, embroidered; scalloped edges .....					
Doilies, drawn work; small; square; embroidered in silk. ....					
Doilies, drawn work .....					
Doilies, square; hemstitched; embroidered in yellow silk. ....					
Doilies, scalloped edge; embroidered in silk .....					
Doilies, appliqué .....					
Towels, glass; red and blue border .....		Oct. 8, 1904	\$0.88½	\$24.00	Woodward & Lothrop.
Jackets, sweeping; white duck .....					
Towels, roller; crash .....					
Aprons, linen; white .....					
Felt, table .....	pieces				
Sheets, linen; double .....					
Sheets, linen; three-quarter .....					
Sheets, cotton; double .....					
Sheets, cotton; three-quarter .....					
Pillow slips, wide linen .....					
Pillow slips, medium .....					
Pillow slips, medium .....					
Bolster cases, linen .....					
Bedspreads, double .....					
Bedspreads, three-quarter .....					

APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2729

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		1		1				June 30, 1905	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		8		8				do	8
		8		8				do	8
		8		8	4	Used as cleaning cloths; worn out.		do	4
		7		7	8	do		do	4
		18		18	6	do		do	12
		23		23				do	23
		7		7	4	Used as cleaning cloths; worn out.		do	3
		8		8				do	8
		70		70	15	Used as cleaning cloths; worn-out.		do	55
		1		1	1	do		do	
		32		32	15	do		do	17
		57		57	15	do		do	42
		9		9				do	9
		40		40				do	40
		47		47	20	Used as cleaning cloths; worn-out.		do	27
		51		51	20	do		do	31
		10		10	6	do		do	4
		55		55	10	do		do	45
		162		162				do	162
		17		17				do	17
		1		1				do	1
		12		12				do	12
		12		12				do	12
		2		2				do	2
		1		1				do	1
		2		2				do	2
		21		21				do	21
		17		17				do	17
		7		7				do	7
		8		8				do	8
		6		6				do	6
52	Nov. 23, 1904		72	72				do	72
		12		12	12	Used as cleaning cloths; worn-out.		do	
		26		26				do	26
		6		6				do	6
		9		9				do	9
		16		16	4	Used as cleaning cloths; worn-out.		do	12
		48		48				do	48
		7		7				do	7
		51		51				do	51
		26		26	12	Used as cleaning cloths; worn-out.		do	14
		45		45				do	45
		20		20				do	20
		11		11				do	11
		21		21				do	21
		7		7				do	7

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Linen—Continued.					
Bath towels, fringed.....					
Bath towels, hemstitched.....					
Towels, blue border, embroidered "U. S.".....					
Towels, gold border, embroidered "U. S.".....					
Towels, crash, servants', embroidered "U. S.".....					
Towels, crash, servants'.....					
Towels, fringed, white, old.....					
Towels, fringed, red, old.....					
Towels, pink border, embroidered "U. S.".....					
Rugs, bath, dark brown.....					
Doilies, Turkish.....					
Scarf, bureau, hemstitched.....					
Scarf, with blue lining.....					
Doilies, lace.....					
Covers, stand, edged with lace.....					
Pillow shams, ruffled.....					
Pillow shams, lace.....	pair.				
Pillow shams, hemstitched and embroidered, pairs.....					
Pillow shams, lace edge.....	pair.				
Pillow shams, sheet.....					
Cover, table, lace edge.....					
Cover, table, fringed.....					
Spreads, bed.....					
Blankets, bed.....					
Blankets.....	pair.				
Sheets, linen.....					
Doilies, embroidered.....					
Doilies, hemstitched.....					
Napkins, hemstitched.....					
Napkins, embroidered.....					
Doilies.....					
Towels, pot.....		Oct. 8, 1904	\$0.12½	\$3.00	Woodward & Lothrop.
Tablecloths.....		Nov. 23, 1904	2.75	49.50	do.....
Tablecloths.....		do.....	4.15	24.90	do.....
Storeroom:					
Hose, ½-inch, 4-ply.....	feet.				
Cooker, water, porcelain lined.....					
Stands, music, iron, used by band.....		June 16, 1905		90.00	E. F. Droop & Sons Co.
Chairs, wooden.....					
Platform, wooden, used by leader of band.....					
Mat, cocoa.....					
Baskets, wood.....		Oct. 31, 1904	2.25	13.50	Dulin & Martin Co.
Racks, skeletons, coat.....					
Tags, brass, used at receptions.....	lot.				
Table leaves, oak, belong to extension table.....					
Wheelbarrow, used in engine room.....					
Shovels, coal.....					
Axe, short handle.....					
Axe, long handle.....					
Truck with rubber-tired wheels.....					
Fan, electric, 16-inch.....					
Comforts, bed.....					
Sweepers, carpet.....					
Pails, swill.....					
Pails, water.....		June 8, 1904	.45	1.80	Dulin & Martin Co.
Scoop, sugar.....					
Brushes, hair.....					
Combs.....					
Pads, table, felt.....					
Stencils, brass.....	set.				



# APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2731

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		28		28				June 30, 1905	28
		24		24				do	24
		155		155	90	Used as cleaning cloths; worn-out.		do	65
		146		146				do	146
		88		88	28	Used as cleaning cloths; worn-out.		do	60
		46		46				do	46
		40		40	20	Used as cleaning cloths; worn-out.		do	20
		72		72				do	72
		15		15				do	15
		6		6				do	6
		45		45				do	45
		30		30				do	30
		4		4	2	Used as cleaning cloths; worn-out.		do	2
		3		3				do	3
		9		9				do	9
		12		12				do	12
		1		1				do	1
		2		2				do	2
		1		1				do	1
		3		3				do	3
		1		1				do	1
		1		1				do	1
		40		40				do	40
		2		2				do	2
		1		1				do	1
		11		11				do	11
		36		36	12	Used as cleaning cloths; worn-out.		do	24
		12		12				do	12
		36		36				do	36
		72		72				do	72
		12		12				do	12
52	Nov. 23, 1904		24	24	14	Used as cleaning cloths; worn-out.		do	10
23	Jan. 24, 1905		18	18				do	18
23	do		6	6				do	6
		400		400				June 30, 1905	400
		1		1				do	1
54	June 23, 1905	48	36	84				do	84
		25		25				do	25
		1		1				do	1
		1		1				do	1
38	Nov. 23, 1904	7	6	13				do	13
		6		6				do	6
		1		1				do	1
		4		4				do	4
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		8		8				do	8
		7		7				do	7
		6		6				do	6
51	July 28, 1904	6	4	10				do	10
		1		1				do	1
		3		3				do	3
		3		3				do	3
		3		3				do	3
		1		1				do	1

## 2732 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Store room—Continued.					
Chairs, folding.....dozen.....					
Pans, dust.....					
Hamper, clothes.....					
Coats, waiters.....					
Aprons, waiters.....		Sept. 28, 1904	\$0.25	\$6.00	Saks & Co.....
Coal chute, canvas.....					
Tennis marker.....					
Washboards.....					
Carpet sweepers.....					
Pans, dust.....					
Pitcher, covered.....					
Dishes, soap.....					
Rat-traps.....					
Mouse traps.....					
Dishes, soap.....					
Mat, door.....					
Mat, door.....					
Spade, small.....					
Spade, No. 2.....					
Toilet set.....					
Pitchers.....					
Brush.....					
Comb.....					
Carpet sweepers.....		Sept. 29, 1904	3.75	11.25	Dulin & Martin Co.
Brooms.....					
Tent tops, marquee.....		June 21, 1904	60.00	120.00	M. G. Copeland Co.
Fans, electric.....		June 23, 1904	10.50	11.00	Sprague Electric Co.
Gloves, rubber.....pairs.....		Sept. 22, 1904	2.00	6.00	The M. Lindsay Rubber Co.
Picks, ice.....		Aug. 8, 1904	.15	.90	Dulin & Martin Co.
Hods, coal.....		do.....	.65	5.85	do.....
Dusters.....		do.....		3.60	do.....
Jackets, duck.....		Sept. 28, 1904	1.00	24.00	Saks & Co.....
Hods, coal.....		Oct. 6, 1904	.60	4.80	Dulin & Martin Co.
Baskets, scrap.....		Oct. 31, 1904		1.50	do.....
Basket for silver.....		Oct. 25, 1904		2.25	do.....
Vases, glass.....		May 9, 1905		1.75	do.....
Ladder, hub.....		May 5, 1905		6.72	Rudolph, West & Co.
Ladder, step.....		June 23, 1905		4.50	James B. Lambie Co.
Tennis net.....		May 29, 1905		5.00	M. A. Tappan & Co.
Cuspidor, china.....					
Candle stand, brass.....					
Laces, Renaissance.....pairs.....					
Spring, double.....					
Pitchers.....					
Colanders, tin.....		Mar. 21, 1905	.60	1.80	Dulin & Martin Co.
Lemon squeezer, aluminum.....					
Plates, pie.....					
Biggin, coffee.....					
Bread raisers.....					
Grater.....					
Boilers, double.....					
Masher, potato.....					
Wringer for clothes.....					
Washboards.....					
Chair, oak.....					Transferred from main vestibule.
Wringers for clothes.....					Transferred from laundry.

APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2733

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		6		6				June 30, 1905	6
		6		6				do	6
		1		1				do	1
		12		12				do	12
40	Oct. 22, 1904	12	24	36	12	Used as cleaning cloths; worn-out.		do	24
		1		1				do	1
		1		1				do	1
		12		12				do	12
		4		4				do	4
		6		6				do	6
		1		1				do	1
		4		4				do	4
		3		3				do	3
		6		6				do	6
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		6		6				June 30, 1905	6
		1		1				do	1
		1		1				do	1
28	Oct. 20, 1904	4	3	7				do	7
		12		12				do	12
40	July 28, 1904		2	2				do	2
44	do		2	2					2
28	Sept. 22, 1904		2	2					2
39	Sept. 23, 1904		6	6				June 30, 1905	6
39	do		9	9				do	9
39	do		10	10				do	10
40	Oct. 22, 1904		24	24				do	24
38	Nov. 23, 1904		8	8				do	8
38	do		2	2				do	2
38	do		1	1				do	1
33	June 20, 1905		6	6					6
40	do		1	1					1
57	June 23, 1905		1	1					1
58	do		1	1				June 30, 1905	1
		1		1		Broken		do	1
		1		1				do	1
		3		3	2	Not found; can not be traced.		do	a 1
		1		1				do	1
		6		6				do	6
70	Apr. 29, 1905		3	3				do	3
		1		1				do	1
		6		6				do	6
		1		1				do	1
		2		2				do	2
		1		1				do	1
		3		3				do	3
		1		1				do	1
		1		1				do	1
		6		6				do	6
			1	1				do	1
			2	2				do	2

a Worn-out.

2734 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Store room—Continued.					
Laces, Renaissance . . . . .	pairs..				Transferred from State Dining Room. Transferred from private dining room.
Pitchers.....					
Kitchen.					
Shades, window.....					
Table, pine.....					
Cups, fish . . . . .	dozen				
Coffeepot, granite.....					
Knife and fork, carving . . . . .					
Pots, granite.....					
Boiler, meat . . . . .					
Bowls, china.....					
Pitchers, china.....					
Cups, china.....					
Plates, china.....					
Boiler, oyster . . . . .					
Strainer, soup.....					
Opener, can.....					
Shaker, pepper.....					
Boiler, fish . . . . .					
Measure, quart.....					
Squeezer, lemon . . . . .					
Plates, pie, granite.....					
Plates, pie, tin . . . . .		Jan. 26, 1905		\$0.50	Dulin & Martin Co.
Pans, bake, iron.....					
Rollers, towel.....					
Coffeepots.....					
Teapots . . . . .					
Grater . . . . .					
Knives, potato.....					
Basins, paper . . . . .					
Tables, pine.....					
Pans, sauce, copper.....					
Kettle, stock, copper.....					
Boilers, fish, copper.....					
Boilers, ham, copper.....					
Bowl, beating, copper.....					
Brasiers, copper.....					
Sugar melter, copper.....					
Molds, fancy, large, jelly, copper.....					
Molds, fancy . . . . .					
Molds, plain, copper . . . . .					
Pan, melting, copper, for sugar.....					
Molds, tin, fancy.....					
Molds, brick ice cream, tin . . . . .					
Molds, round, tin . . . . .					
Molds, melon, tin . . . . .					
Mortar, marble . . . . .					
Pestles, for mortar . . . . .					
Rack, galvanized iron . . . . .					
Molds, lead, individual, ice cream . . . . .					
Block, meat, round . . . . .					
Chopper, meat, "Enterprise" . . . . .					
Boards, oak . . . . .					
Cleavers . . . . .					
Saw, meat . . . . .					
Ladles, soups and sauces.....					
Molds, tin, individual, small . . . . .					
Molds, tin, individual, medium . . . . .					
Cutters, vegetable.....					
Cutters, cake, fancy.....					
Molds, block, tin, small . . . . .					
Molds, block, tin, medium . . . . .					
Molds, block, tin, pyramid . . . . .					
Formers, pastry, cup.....					
Mold, tin, cone-shaped . . . . .					
Molds, flat, pear-shape, small.....					

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
			5	5				June 30, 1905	5
			6	6				do	6
		2		2				June 30, 1905	2
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		13		13				do	13
		1		1				do	1
		12		12				do	12
		12		12				do	12
		12		12				do	12
		12		12				do	12
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		3		8				do	8
21	Feb. 15, 1905	3	6	9	3	Thrown away; worn-out.		do	6
		6		6				do	6
		2		2				do	2
		2		2				do	2
		2		2				do	2
		1		1				do	1
		6		6				do	6
		2		2				do	2
		4		4				do	4
		24		24				do	24
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		9		9				do	9
		19		19				do	19
		4		4				do	4
		1		1				do	1
		4		4				do	4
		5		5				do	5
		8		8				do	8
		2		2				do	2
		1		1				do	1
		2		2				do	2
		1		1				do	1
		24		24				do	24
		1		1				do	1
		1		1				do	1
		2		2				do	2
		2		2				do	2
		1		1				do	1
		2		2				do	2
		71		71				do	71
		16		16				do	16
		3		3				do	3
		6		6				do	6
		64		64				do	64
		14		14				do	14
		23		23				do	23
		2		2				do	2
		1		1				do	1
		28		28				do	28

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Kitchen—Continued.					
Cutters, pastry .....					
Chair, arm, painted red .....					
Freezers, ice cream .....					
Shaker, pepper .....					
Coffee mill .....					
Clock, 8-day, wooden .....					
Pan, baking, patent, double .....					
Baskets, frying, iron .....					
Pots, porcelain-lined .....					
Waffle iron .....					
Molds, cake, tin, large, round .....					
Pans, drip .....		Mar. 21, 1905	\$0.85	\$2.10	Dulin & Martin Co.
Steamer .....					
Steamer, patented .....					
Kettle, tea, iron .....					
Colanders, tin .....		Mar. 21, 1905	.60	1.80	Dulin & Martin Co.
Pan, bread .....					
Boiler, double, agate ware .....					
Crocks .....					
Bowls, white .....					
Pans, dish, tin .....					
Pans, frying .....		Mar. 21, 1905	.40	.80	Dulin & Martin Co.
Broilers, wire .....		do .....	.60	1.80	do .....
Plates, pie .....					
Pans, muffin, Russian ware .....					
Pans, bread, Russian ware .....					
Pans, roll, Russian ware .....					
Grater, nutmeg .....		Mar. 21, 1905	.25	.50	Dulin & Martin Co.
Knife, chopping .....					
Strainers, gravy, tin .....		Aug. 1, 1904	.10	.40	Dulin & Martin Co.
Measure, quart, graduated .....					
Box, knife, walnut .....					
Funnel, tin .....					
Grater, bread, tin .....					
Dredges, tin .....					
Cans, garbage, galvanized iron, small .....					
Pan, "Bain Marie," to use on range .....					
Tureen, soup, yellow ware .....					
Cups, hotel china, white .....					
Saucers, hotel china, white .....					
Dishes, vegetable, hotel china .....					
Platters, hotel china .....					
Knife, palette, long .....					
Knife, sabatier, scallop .....					
Openers, can, 1 nickel and 1 iron .....					
Corkscrew, wooden handle .....					
Scoop, potato .....					
Steel .....					
Dishes, meat .....		Feb. 7, 1905		2.60	Dulin & Martin Co.
Saucepans, assorted .....	dozen				
Kettle, tea .....					
Boilers .....					
Griddle .....					
Boilers, double .....					
Pans, jelly .....					
Spoons, iron, assorted .....					
Washer, lettuce .....					
Waffle iron .....					
Bowls .....					
Pans, baking .....					
Muffin rings .....					
Spoons, table .....					
Measure, tin .....					

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		5		5				June 30, 1905	5
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		8		8				do	3
		1		1				do	1
		1		1				do	1
		3		3				do	3
70	Apr. 29, 1905	18	6	24				do	24
		1		1				do	1
		1		1				do	1
70	Apr. 29, 1905	3	3	6	3	Transferred store- room.		do	3
		1		1				do	1
		1		1				do	1
		2		2				do	2
		9		9	6	Thrown away; worn-out.		do	3
70	Apr. 29, 1905	2		2				do	2
		23	2	25				do	25
70	do	5	3	8				do	8
		8		8				do	8
		2		2				do	2
		8		8				do	8
70	Apr. 29, 1905	5		5				do	5
		1	2	3	1	Thrown away; worn-out.		do	2
39	Sept. 23, 1904	1		1				do	1
		3	4	7				do	7
		1		1				do	1
		1		1				do	1
		4		4				do	4
		1		1				do	1
		3		3				do	3
		2		2				do	2
		1		1				do	1
		1		1				do	1
		12		12				do	12
		12		12				do	12
		6		6				do	6
		6		6	2	Thrown away; broken.		do	4
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
88	Mar. 17, 1905	1		1				do	1
		6	6	12	6	Thrown away; broken.		do	6
		1		1				do	1
		1		1				do	1
		5		5				do	5
		1		1				do	1
		2		2				do	2
		8		8				do	8
		6		6				do	6
		1		1				do	1
		1		1				do	1
		12		12				do	12
		7		7				do	7
		18		18				do	18
		5		5				do	5
		1		1				do	1



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Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Kitchen—Continued.					
Shaker, salt.....					
Measures, tin.....					
Knife, carving.....					
Coffeepot.....		Oct. 1, 1904	\$1.00	\$1.00	Dulin & Martin Co.
Teapot.....					
Tea caddy.....					
Pot, stock.....					
Knife.....					
Fork.....					
Bowl, chop.....					
Strainer.....					
Beater, egg.....					
Turners, cake.....					
Beater, egg.....					
Cover, apple.....					
Pans, dish.....					
Shears, sardine.....	pair				
Knife, chop.....					
Can, tin, for flour.....					
Pitchers.....					
Strainer.....					
Brush, for cleaning silver.....					
Chopper, meat.....					
Mold.....					
Jar, for tea.....					
Pans.....		Oct. 15, 1904	.40	.80	Dulin & Martin Co.
Kettles.....					
Cutters, tin.....	set				
Steamer.....					
Cutter, meat.....					
Colanders.....		June 27, 1904	1.40	2.80	Dulin & Martin Co.
Pans, dish.....					
Pans, bread.....					
Knives.....		Oct. 31, 1904	.10	.60	Dulin & Martin Co.
Chairs.....					
Sieve.....					
Dishes, butter.....					
Teapots.....					
Colander.....					
Dish, butter, covered.....					
Bowls.....		Oct. 15, 1904	.40	2.40	Dulin & Martin Co.
Boilers, oatmeal.....					
Muffin pan.....					
Pans, meat.....		Oct. 20, 1904	.90	1.80	Dulin & Martin Co.
Pot, bean.....					
Waffle iron.....					
Pitchers.....					
Coffee pot.....					
Openers, can.....					
Molds, fish.....					
Beaters, egg.....					
Coffee pot.....					
Pans, sauce.....		Oct. 15, 1904		20.60	Dulin & Martin Co.
Awning.....		June 1, 1904	5.90	5.90	A. E. Kennedy..
Brushes, polishing, electric.....		July 19, 1904	2.25	4.50	Barber & Ross..
Dishes, bake.....		Dec. 20, 1904	.70	2.10	Dulin & Martin Co.
Covers, apple.....		do		.50	do
Knives.....		Jan. 30, 1905		6.75	do

## APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2739

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		1		1				June 30, 1905	1
		2		2				do	2
		1		1				do	1
38	Nov. 23, 1904	4	1	5				do	5
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		6		6	1	Thrown away; broken and worthless.		do	5
		1		1				do	1
		1		1	1	Thrown away; broken and worthless.			
		1		1				June 30, 1905	1
		1		1				do	1
		1		1				do	1
38	Nov. 23, 1904	2	2	4				do	4
		2		2				do	2
		1		1				do	1
		1		1				do	1
51	July 23, 1904	2	2	4				do	4
		6		6				do	6
		12		12				do	12
38	Nov. 23, 1904	9	6	15	8	Thrown away, lost, or worn-out.		do	7
		9		9				do	9
		1		1				do	1
		2		2				do	2
		2		2				do	2
		1		1				do	1
		1		1				do	1
38	Nov. 23, 1904	12	6	18	6	Thrown away; broken and worthless.		do	12
		2		2				do	2
		1		1				do	1
38	Nov. 23, 1904	2	2	4				do	4
		1		1				do	1
		1		1				do	1
		6		6				do	6
		1		1				do	1
		2		2				do	2
		2		2				do	2
		3		3				do	3
		1		1				do	1
38	Nov. 23, 1904	4	16	20				do	20
11	July 2, 1904		1	1				do	1
53	Sept. 23, 1904		2	2				do	2
22	Jan. 24, 1905		3	3				do	3
22	do		6	6				do	6
21	Feb. 15, 1905		6	6				do	6

2740 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Küchen—Continued.					
Squeezers, lemon .....		Feb. 11, 1905	\$0.85	\$2.55	Dulin & Martin Co.
Boiler, coffee.....		do		1.50	do
Pots, coffee.....		Mar. 6, 1905	.90	1.80	do
Forks .....		Mar. 11, 1905		1.88	do
Teaspoons .....		do	.75	1.50	do
Knives.....		do		2.25	do
Box, salt.....		Mar. 20, 1905		.30	do
Pans, steel .....		Mar. 21, 1905		2.50	do
Skimmers, milk.....		do		.36	do
Scoops, potato.....		do	.40	.80	do
Pins, rolling .....		do	.15	.30	do
Cups and saucers.....		do		.78	do
Carvers .....	sets	do	1.50	3.00	do
Sieves.....		do	2.25	4.50	do
Billiard room.					
Carpet, Wilton, red .....					
Rack, hat, walnut .....					
Chairs, walnut, perforated seats.....					
Cuspidor, china.....					
Chair, arm, walnut, upholstered in leather ..					
Stand, wash, walnut.....					
Bowl and pitcher, white china.....					
Bottle, leather.....					
Fender, brass .....					
Rules, framed.....	set				
Engine room.					
Coal hods, galvanized iron .....					
Shovels, fire, galvanized.....					
Baskets, wood .....					
Pump, electric.....					
Plumber's room.					
Square, steel, 2-foot.....					
Grindstone .....					
Machine, drilling, and 12 drills.....					
Stocks and dies .....	set				
Pump, Nopple, force and suction.....					
Plungers, cup.....					
Trowel, mason's .....					
Trowel, mason's .....					
Wrench, monkey .....					
Tape line, 50-foot, metallic .....					
Electricians' room.					
Pliers, cutting, 6-inch, side.....	pair				
Pliers, Bernard, 6-inch .....	do				
Pliers, 6-inch .....	do				
Wrench, Stillson, 8-inch .....					
Screw-driver, 3-inch .....					
Screw-driver, 6-inch .....					
File, rat-tail, 6-inch.....					
Gentlemen's Senatorial dressing room.					
Carpet, Wilton .....	yards				
Mirror, over mantle.....					
Wardrobes, golden-oak .....					
Covers, loose cotton damask.....					
Ladies' Senatorial dressing room.					
Covers, loose cotton damask.....					
Gentlemen's diplomatic dressing room.					
Covers, loose cotton damask.....					

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
38	Mar. 17, 1905	....	3	3	.....	.....	.....	June 30, 1905	3
38	do	.....	1	1	.....	.....	.....	do	1
70	Apr. 29, 1905	.....	2	2	.....	.....	.....	do	2
70	do	.....	18	18	.....	.....	.....	do	18
70	do	.....	24	24	.....	.....	.....	do	24
70	do	.....	18	18	.....	.....	.....	do	18
70	do	.....	1	1	.....	.....	.....	do	1
70	do	.....	2	2	.....	.....	.....	do	2
70	do	.....	4	4	.....	.....	.....	do	4
70	do	.....	2	2	.....	.....	.....	do	2
70	do	.....	2	2	.....	.....	.....	do	2
70	do	.....	6	6	.....	.....	.....	do	6
70	do	.....	2	2	.....	.....	.....	do	2
70	do	.....	2	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	June 30, 1905	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	8	.....	8	.....	.....	.....	do	8
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	12	.....	12	.....	.....	.....	June 30, 1905	12
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	June 30, 1905	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	141½	.....	141½	.....	.....	.....	June 30, 1905	141½
.....	.....	1	.....	1	.....	.....	.....	do	1
.....	.....	2	.....	2	.....	.....	.....	do	2
.....	.....	6	.....	6	.....	.....	.....	do	6
.....	.....	9	.....	9	.....	.....	.....	June 30, 1905	9
.....	.....	8	.....	8	.....	.....	.....	June 30, 1905	8

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
BASEMENT—continued.					
Diplomatic assembly reception room.					
Carpet, Wilton .....	yards.				
Sofas, with backs and arms, gilded wood frames, upholstered in blue damask.					
Chairs, arm, same as above .....					
Chairs, without arms, same as above .....					
Divan, circular, gilded wood frame, 6 legs, etc.					
Ladies' diplomatic dressing room.					
Covers, loose, cotton damask .....					
Corridor.					
Drapery, satin damask, red .....	pairs.				
Settees, reupholstered in satin damask .....					
Carpet, Wilton, red .....	yards.				
Settees, oak frames, upholstered in red .....					
Arm chairs, oak frames, upholstered in red ..					
Covers, loose, cotton damask .....					
Cabinets, china .....					
Do .....		May 19, 1904	\$21.50	\$86.00	A. E. Kennedy..
WEST TERRACE.					
Servants' dining room.					
Table, dining, plain .....					
Chair, youth's .....					
Screen, Japanese .....					
Tablecloths .....					
Napkins .....					
Bowls, oatmeal .....					
Plates .....					
Plates, soup .....					
Cups, egg .....					
Bowls, sugar .....					
Pitchers .....					
Knives .....					
Spoons, tea .....					
Forks .....					
Tumblers .....					
Cruets, salt .....					
Cruets, pepper .....					
Chairs .....					
Cruets, glass .....					
Teapots .....					
Mats, table .....					
Machine, sewing, "Domestic" .....					
Table, extension, 8-foot, golden oak .....					
Sideboard, golden oak .....					
Matting, white china .....	yards.				
Shade, window .....		June 1, 1904	3.40	3.40	A. E. Kennedy.
Cups and saucers .....	dozen.				
Servant's room.					
Carpet, Wilton .....	yards.				
Matting, white china .....	do.				
Bed, iron .....					
Mattresses, hair .....					
Spring, woven wire .....					
Pillows, feather .....					
Bed, folding, walnut .....					
Mattress .....					
Chair, arm, upholstered .....					

APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2743

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		115½		115½				June 30, 1905	115½
		4		4				do	4
		4		4				do	4
		8		8				do	8
		1		1				do	1
		12		12				June 30, 1905	12
		2		2				June 30, 1905	2
		4		4				do	4
		365½		365½				do	365½
		4		4				do	4
		2		2				do	2
		5		5				do	5
		2		2	2	1 in bedroom west of alcove hall; 1 in room west of library.			
27	May 21, 1904	4		4				June 30, 1905	4
		1		1				June 30, 1905	1
		1		1				do	1
		1		1	1	Not found; can not be traced.		do	
		10		10				do	10
		36		36				do	36
		12		12				do	12
		24		24				do	24
		12		12				do	12
		12		12	6	Thrown away; broken.		do	6
		2		2				do	2
		4		4				do	4
		9		9				do	9
		24		24	4	Lost in service.		do	20
		12		12				do	12
		15		15				do	15
		2		2				do	2
		2		2				do	2
		9		9				do	9
		2		2				do	2
		1		1				do	1
		24		24	24	Not found; can not be traced.		do	
		1		1				do	1
		1		1				do	1
		1		1				do	1
11	July 2, 1904	40		40				do	40
		1	1	2				do	2
		2		2				do	2
		65		65				June 30, 1905	65
		370		370				do	370
		1		1				do	1
		3		3				do	3
		1		1				do	1
		3		3				do	3
		1		1	1	Sold at auction.	The President		
		1		1				June 30, 1905	1
		1		1				do	1

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from.
			Unit.	Total.	
WEST TERRACE—continued.					
Servants' room—Continued.					
Rocker, wicker .....	.....	.....	.....	.....	.....
Chair, arm, high back, painted red .....	.....	.....	.....	.....	.....
Rocker, cherry .....	.....	.....	.....	.....	.....
Table, pine .....	.....	.....	.....	.....	.....
Bureau, ash .....	.....	.....	.....	.....	.....
Washstand, ash .....	.....	.....	.....	.....	.....
Comforters .....	.....	.....	.....	.....	.....
Toilet set. ....	.....	.....	.....	.....	.....
Sideboard, oak .....	.....	.....	.....	.....	.....
Desk, oak .....	.....	.....	.....	.....	.....
Chairs, wicker .....	.....	.....	.....	.....	.....
Mirror, oak frame .....	.....	.....	.....	.....	.....
Stand, shaving, mahogany .....	.....	.....	.....	.....	.....
Bed, small, iron .....	.....	.....	.....	.....	.....
Dresser, rosewood, painted white .....	.....	.....	.....	.....	.....
Wardrobe, walnut .....	.....	.....	.....	.....	.....
Chairs, splan seat .....	.....	.....	.....	.....	.....
Washstand, mahogany .....	.....	.....	.....	.....	.....
Curtains, cotton damask .....	.....	.....	.....	.....	.....
Bedstead, enamel and brass, with spring .....	.....	.....	.....	.....	.....
Mattress, cotton .....	.....	.....	.....	.....	.....
Comfort, bed .....	.....	.....	.....	.....	.....
Shades, made from old shades .....	.....	.....	.....	.....	.....
Matting, white china .....	yards.	.....	.....	.....	.....
Shades, white Holland .....	.....	.....	.....	.....	.....
Beds, iron, 8' by 6' .....	.....	July 9, 1904	\$7.50	\$15.00	W. B. Moses & Sons.
Mattresses, hair and cotton .....	.....	do .....	3.50	7.00	do .....
Chairs, arm, upholstered in green rep .....	.....	.....	.....	.....	.....
Laundry.					
Irons, polishing .....	.....	.....	.....	.....	.....
Baskets .....	.....	.....	.....	.....	.....
Irons, sad .....	.....	.....	.....	.....	.....
Cooler, water .....	.....	.....	.....	.....	.....
Stoves, gas, 2-burner, with 8 small iron heaters .....	.....	.....	.....	.....	.....
Stove, gas, 2-burner, with 2 sad iron heaters .....	.....	.....	.....	.....	.....
Tables, pine, large .....	.....	.....	.....	.....	.....
Irons, flat, 6 and 7 pounds .....	.....	.....	.....	.....	.....
Board, ironing .....	.....	.....	.....	.....	.....
Board, bosom .....	.....	.....	.....	.....	.....
Wringer for clothes .....	.....	Nov. 15, 1904	12.00	12.00	Dulin & Martin Co.
Wardrobe, maple .....	.....	.....	.....	.....	.....
Brush, fringe .....	.....	.....	.....	.....	.....
Washboards .....	.....	.....	.....	.....	.....
Truck, flat, with rubber-tired wheels .....	.....	.....	.....	.....	.....
Stands for flatirons .....	.....	.....	.....	.....	.....
Iron holders .....	.....	.....	.....	.....	.....
Iron stands .....	.....	.....	.....	.....	.....
Boiler .....	.....	Oct. 15, 1904	7.50	7.50	Dulin & Martin Co.
Sheeting .....	yards.	Nov. 21, 1904	.30	9.00	Woodward & Lothrop.
Cheese cloth .....	do.	do .....	.10	2.00	do .....
Bouquet room.					
Vases .....	.....	.....	.....	.....	.....
Box, ice, oak, "Ridgeway" .....	.....	.....	.....	.....	.....
WEST TERRACE, TOP.					
Fountain, white marble .....	.....	.....	.....	.....	.....
Plant boxes, tile front with duplicate inner boxes of zinc .....	.....	.....	.....	.....	.....
Settees, stone .....	.....	.....	.....	.....	.....



Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		1		1		Worn		June 30, 1905	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		3		3				do	3
		1		1				do	1
		1		1	1	Not found; can not be traced.			
		1		1				June 30, 1905	1
		2		2		Worn		do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1	1	In bedroom, west alcove hall.			
		1		1				June 30, 1905	1
		2		2				do	2
		1		1				do	1
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		7		7				do	7
		245		245				do	245
33	Aug. 31, 1904	3		3				do	3
			2	2				do	2
33	do		2	2				do	2
		2		2				do	2
		4		4				June 30, 1905	4
		2		2				do	2
		32		32				do	32
		1		1				do	1
		4		4				do	4
		1		1				do	1
		4		4				do	4
		14		14				do	14
		1		1				do	1
		1		1				do	1
37	Dec. 28, 1904	1	1	2	2	In storeroom; 1 worn-out.		do	
		1		1				do	1
		1		1	1	Thrown away; worn-out.		do	
		12		12	6	Transferred to storeroom; worn- out.		do	6
		1		1				do	1
		3		3				do	3
		12		12				do	12
		6		6				do	6
38	Nov. 23, 1904		1	1				do	1
23	Jan. 21, 1905		30	30				do	30
23	Jan. 24, 1905		20	20	10	Used as cleaning cloths; worn-out.		do	10
		42		42				June 30, 1905	42
		1		1				do	1
		1		1				June 30, 1905	1
		20		20				do	20
		6		6				do	6

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
EAST TERRACE.					
Corridor.					
Settee, rustic.....					
Table, rustic.....					
Chair, rustic.....					
POLICEMEN'S LOBBY.					
Stand, water cooler.....					
EAST TERRACE, TOP.					
Fountain, white marble.....					
Plant boxes, tile front with duplicate inner boxes of zinc.					
Settees, stone.....					
EAST AND WEST TERRACES.					
Trees, bay.....					
Trees, boxwood.....					
Tree, standard bay.....					
Trees, pyramid bay.....					
MISCELLANEOUS LIST.					
Mat, lamp; plush.....					
Machine, sewing; Singer.....					
Trays.....					
Pitchers and trays, plated.....					
Rope barrier's, plush.....					
Flag, storm.....					
Carpet, Wilton.....yards.					
Pique.....do.		Feb. 21, 1905		\$5.00	Dulin & Martin Co.
Vases.....					
Table, pine; 6-foot.....					
Beds.....					
Mattresses, hair and cotton.....					
Beds, white enamel.....					
Mattresses, hair and cotton.....					
Chairs, splan seat.....		Oct. 31, 1904	\$3.00	3.00	Dulin & Martin Co.
Shade, lamp.....		Oct. 20, 1904	2.75	2.75	The E. F. Brooks Co.
Stove, gas; 2-burner.....					
Bureau sets.....					
Baskets for wood.....		Apr. 7, 1905		8.50	Dulin & Martin Co.
Rack, bicycle.....					
Cabinet.....					
Desk.....					
Shade, lamp; cut.....					
Vases.....					
Lamp, silver.....					
Chairs, wooden.....dozen.					
Covers, furniture; cotton damask.....					
Stands, music.....					
Table, pine; used in state dining room; covered with green balze.					
Hamper, clothes.....		Nov. 17, 1904	2.40	2.40	Dulin & Martin Co.
Scale, platform; Fairbanks No. 11.....					
Hose, air; black rubber.....feet.					
Stand, mahogany; marble top.....					
Boxes, hat.....lot.					
Carpet, Wilton; red.....					
Desk, walnut.....					
Pail, galvanized iron.....					
Chairs, splan seat.....					
Carpet, Wilton.....yards.					
Mirror, toilet.....					
Costumers, mahogany.....					

APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2747

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		1		1				June 30, 1905	1
		1		1				do	1
		1		1				do	1
		1		1				June 30, 1905	1
		1		1				June 30, 1905	1
		20		20				do	20
		6		6				do	6
		31		31				June 30, 1905	31
		72		72				do	72
		1		1				do	1
		2		2				do	2
		1		1				June 30, 1905	1
		1		1				do	1
		6		6				do	6
		8		8				do	3
		8		8				do	3
		1		1				do	1
		232		232				do	232
		56		56				do	56
38	Mar. 17, 1905	18	18	36				do	36
		1		1				do	1
		2		2				do	2
		2		2				do	2
		4		4				do	4
		4		4				do	4
		6		6				do	6
38	Nov. 23, 1904	1	1	2	1	Thrown away; broken.		do	1
60	Dec. 30, 1904	1	1	2				do	2
		2		2				do	2
47	May 22, 1905	6	3	9				do	9
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		36		36				do	36
		1		1				do	1
		6		6				do	6
		271		271				do	271
		5		5				do	5
		1		1				do	1
37	Dec. 28, 1904		1	1				do	1
		1		1				do	1
		200		200				do	200
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		4		4				do	4
		41		41				do	41
		1		1				do	1
		3		3				do	3

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
MISCELLANEOUS LIST—continued.					
Bench, oak, with green velour cushion.....					
Screen, 4-fold, covered with rep.....					
Screen, 4-fold, covered with tapestry.....					
Curtains, red flax velour, lined with silk, put up with poles, pairs.....					
Boxes, wooden.....					
Reels, hose.....					
Sprayer, automatic, and rods.....					
Settee, rustic.....					
Table, rustic.....					
Chairs, arm, white enamel.....					
Settees, white enamel.....					
Extinguishers, fire.....					
Rubber tubing used on fire extinguishers, feet.....					
Bottles, fire extinguisher.....					
Padding.....yards.....					
Damask, cotton.....do.....					
Table, rustic.....					
Settee, rustic.....					
Detector, time, watchman's.....		Aug. 8, 1904	\$41.00	\$41.00	American Watchman's Time Detector Co.
Wrench, Coes.....		Sept. 30, 1904	1.65	1.65	James B. Lambie Co.
Jardinières.....		Nov. 17, 1904	17.40	17.40	A. Leavey.....
Shades, candelabra, silk.....		Dec. 20, 1904	2.50	25.00	Edw. F. Cauldwell Co., New York.
Curtains, window, imperial Swiss.....pairs.....		Jan. 13, 1905	8.20	8.20	E. J. Kennedy..
Jardinières.....		Dec. 7, 1904		75.63	Dulin & Martin Co.
Water can.....		Dec. 14, 1904	.70	.70	do.....
Wood baskets.....		Dec. 20, 1904	2.50	15.00	do.....
Cuspidors.....		Dec. 28, 1904	.85	3.40	do.....
Cans, garbage.....		Dec. 30, 1904	8.75	7.50	do.....
Hangers, coat.....		Nov. 22, 1904		1.80	Woodward & Lothrop.
Hangers, trousers.....		do.....		5.40	do.....
Comfort.....		Jan. 8, 1905	4.00	4.00	do.....
Brushes, hair.....		Jan. 12, 1905		6.50	do.....
Combs.....		do.....		1.75	do.....
Ladder.....		Jan. 13, 1905	2.90	2.90	Rudolph, West & Co.
Mats, white rubber.....		Oct. 3, 1904	.50	3.00	The M. Lindsay Rubber Co.
Matting, cocoa.....yards.....		Mar. 8, 1905	.60	49.80	W. B. Moses & Sons.
Screens, silk.....		Mar. 10, 1905	2.50	37.50	Edw. F. Cauldwell & Co.
Hangers, coat.....		Mar. 20, 1905	.10	2.40	Woodward & Lothrop.
Shades, lamp.....		Apr. 15, 1905		5.00	Dulin & Martin Co.
Screen, porch, 8 by 13 feet.....	1	Apr. 14, 1905		8.00	W. B. Moses & Sons.
Stretcher.....	1	May 6, 1905		5.00	do.....
Canopy.....	1	do.....		4.50	do.....
Screen, canvas, for grounds.....	1	May 19, 1905		34.29	do.....
Curtain, canvas.....	1	May 27, 1905		7.08	do.....
Hammock.....	1	May 17, 1905		2.50	Woodward & Lothrop.
Bronze eagle.....	1	Dec. 28, 1904		13.85	M. G. Copeland Co.
Chairs, oak.....	3				Transferred from main vestibule.

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		1		1				June 30, 1905	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		13		13				do	13
		2		2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		4		4				do	4
		2		2				do	2
		30		30				do	30
		50		50				do	50
		24		24	21	Not found; sup- posed to have been lost when house was re- modeled.		do	3
		84		84				do	84
		574		574				do	574
		1		1				do	1
		1		1				do	1
44	Oct. 27, 1904		1	1				do	1
55	do		1	1				do	1
45	Dec. 28, 1904		48	48				do	48
74	Dec. 31, 1904		10	10				do	10
15	Jan. 21, 1905		1	1				do	1
22	Jan. 24, 1905		24	24				do	24
22	do		1	1				do	1
22	do		6	6				do	6
22	do		4	4				do	4
22	do		2	2				do	2
23	do		24	24				do	24
23	do		24	24				do	24
38	Feb. 17, 1905		1	1				do	1
38	do		3	3				do	3
38	do		3	3				do	3
50	Feb. 21, 1905		1	1				do	1
8	Mar. 3, 1905		6	6				do	6
20	Apr. 25, 1905		83	83				do	83
33	do		15	15				do	15
62	Apr. 29, 1905		24	24				do	24
47	May 22, 1905		4	4				do	4
39	June 20, 1905		1	1				do	1
39	do		1	1				do	1
39	do		1	1				do	1
39	do		1	1				do	1
52	June 23, 1905		1	1				do	1
64	June 28, 1905		1	1				do	1
			3	3				do	3

2750 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Brought from—
			Unit.	Total.	
PRESIDENT'S OFFICE BUILDING.					
Globe, geographical .....	1	Oct. 25, 1904	.....	\$150.00	Weber Costello Fricke Co., Ch.
Map frame.....					
PRESIDENT'S STABLE.					
Carpet, Wilton.....					
Stove, small, and pipe.....					
Boiler, copper, for heating water.....					
Chairs, wooden .....					
Washstand, walnut, marble top .....					
Hose, rubber, 1/4-inch.....feet..					
Skins, chamois .....					
Brush, horse .....					
Brush, mane.....					
Duster, feather .....					
Robe, lap .....					
Brushes, dandruff .....					
Stove, No. 40, "Comet," with pipe.....					
Sieve, ash .....					
Boots, rubber.....pair..					
Towels, horse.....					
Hose, rubber, 1-inch, 3-ply.....feet..					
Crock .....					
Hods, coal .....					
Shades, window.....	11	June 30, 1905	.....	11.22	W. B. Moses & Sons.
Brushes, wall .....					
Reins, russet leather.....					
Comb, curry .....					
Scraper, sweat .....					
Screens, fly, wooden frames.....					
Trap, rat .....					
Horse, bay .....					
Oilcloth .....	yards..				
Blankets, horse .....					
Surcingle .....					
Duster, feather.....					
Brush, dandruff .....					
Boots, rubber.....pair..					

Inventory of public property, Executive Mansion, June 30, 1906—Continued.

Voucher		last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	D						Date.	Quantity.
28	May 22, 1905	1	1				June 30, 1905	1
		1	1				do	1
		1	1	1	Not found			
		1	1				June 30, 1905	1
		1	1				do	2
		2	2				do	
		1	1	1	Not found			
		20	20				June 30, 1905	20
		6	6	6	Supposed to have been thrown away; worn-out in service.			
		1	1	1	Transferred to stable, Public Buildings and Grounds.			
		3	3	3	do			
		1	1	1	Supposed to have been thrown away; worn-out in service.			
		1	1	1	Transferred to stable, Public Buildings and Grounds.			
		2	2	2	do			
		1	1				June 30, 1905	1
		1	1	1	Not found			
		1	1	1	Transferred to stable, Public Buildings and Grounds.			1
		6	6	6	Not found			
		100	100				June 30, 1905	100
		1	1	1	Placed in chimney.			
		2	2				June 30, 1905	2
33	July 28, 1904	4	11	15			do	15
		3	3	2	Not found		do	
		16	16		On return by mistake; probably private property of President.			
		1	1	1	Transferred to stable Public Buildings and Grounds.			
		1	1	1	do			
		2	2	2	Not found			
		1	1				June 30, 1905	1
		1	1	1	Transferred to stable Public Buildings and Grounds.			
		64	64		Worn-out; covered up on floor with new linoleum.		June 30, 1905	64
		2	2	2	Transferred to stable Public Buildings and Grounds.			
		1	1	1	do			
		1	1	1	On return of Public Buildings and Grounds; placed on White House inventory by mistake.			
		1	1	1	do			
		1	1	1	do			



2752 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
PRESIDENT'S STABLE—continued.					
Whisk broom .....					
Robe, lap .....					
Coat, rubber .....					
Whip, whalebone.....					
Brushes, wire .....					
Skin, chamois .....					
Table sections, used at state dinners.....	12				Transferred from stable Public Buildings and Grounds.
Trusses for table used at state dinners.....	16				do
STABLE OF PUBLIC BUILDINGS AND GROUNDS.					
Brush, horse .....	1				Transferred from President's stable on this inventory.
Brushes, mane.....	3				do
Robe, lap .....	1				do
Brushes, dandruff .....	2				do
Mare, bay .....					
Wagon, Dayton, with top and two seats.....					
Harness, single .....	set.				
Harness, single, Concord .....					
Blanket, woolen, for street use .....					
Blanket, stable .....					
Blanket, rubber .....					
Robes, light-weight, for wagon.....					
Robe, fur .....					
Table sections, used at state dinners .....					
Trusses for table, used at state dinners .....					
Comb, curry .....	1				Transferred from President's stable on this inventory.
Scraper, sweat .....	1				do
Horse, bay .....	1				do
Blankets, horse .....	2				do
Surcingle .....	1				do
Boots, rubber .....	pair. 1				do
STOREHOUSE AT PROPAGATING GARDENS.					
Seats, upholstered, for elevator.....					
Mantelpiece, mahogany (from Red Parlor) ..					
Table, oval, large, pine.....					
Bed, rosewood .....					
Bed, walnut .....					
Table ends, used in state dining room...lot..					
Doors, baize, used at receptions .....					
Desk, walnut, carved ornaments .....					
Stove, self-feeding .....					
Stove, "Belle" No. 13 .....					
Chair, barber's, walnut, upholstered .....					
Sofas, in frame, 1 upholstered .....					

APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2753

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Voucher.		On hand last re- turn.	Received since last return.	Total to be ac- counted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.	
No.	Date.							Date.	Quan- tity.
		1		1	1	Supposed to have been thrown away; worn-out in service.			
		1		1	1	On return of Pub- lic Buildings and Grounds; placed on White House inventory by mistake.			
		1		1	1	do			
		1		1	1	do			
		4		4	4	Transferred to storehouse at Propagating Gar- dens.			
		1		1	1	Supposed to have been thrown away; worn-out in service.			
			12	12				June 30, 1905	12
			16	16				do	16
			1	1				June 30, 1905	1
			3	3				do	3
			1	1				do	1
			2	2				do	2
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		1		1				do	1
		2		2				do	2
		1		1				do	1
		12		12	12	Transferred to President's stable.		do	
		16		16	16	do		do	
			1	1				do	1
			1	1				do	1
			1	1				do	1
			2	2				do	2
			1	1				do	1
			1	1				do	1
		2		2				June 30, 1905	2
		1		1	1	Sold at auction.	The President	June 30, 1905	1
		1		1	1	Sold at auction.	The President		
		1		1	1	do	do		
		1		1	1	Used in shops in re- pairs, etc.			
		3		3	3	Sold at auction.	The President		
		1		1	1	Sold at auction.	The President	June 30, 1905	1
		1		1	1	do	do		
		1		1	1	do	do		
		2		2				June 30, 1905	2

Inventory of public property, Executive Mansion, June 30, 1905—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
STOREHOUSE AT PROPAGATING GARDENS—continued.					
Sofa, upholstered in green damask .....					
Stands, used in front of coat boxes ..... lot..					
Lamps, gas, used at receptions, under canopies .....					
Matting, cocoa ..... yards..					
Pans, dish .....					
Extinguishers, fire, Babcocks.....					
Stoves, gas, 4-tube .....					
Wardrobe, walnut .....					
Matting, white china ..... yards..					
Spring, double.....					
Basket .....					
Carpet, Wilton; red ..... yards..					
Table, walnut, marble top .....					
Wardrobe, mahogany .....					
Emery wheel, 4-inch.....					
Matting, cocoa ..... yards..					
Stove .....					
Metal board to go under stove.....					
Desk, walnut .....	1				Transferred from main vestibule.
Cabinet, carved, mahogany, tall .....	1				Transferred from Green Parlor.
Laces, window .....	2				Transferred from Red Parlor.
Brushes, wire.....	4				Transferred from President's stable.

# APPENDIX D D D—PUBLIC BUILDINGS AND GROUNDS. 2755

*Inventory of public property, Executive Mansion, June 30, 1905—Continued.*

Voucher		On hand last re- turn.	Received since last return.	Total to be ac- counted for	Disposed of since last return.	Method and date of disposal.	
No.	Date.						
		1	1	1			June 30, 1906 1
		1	1	1	1	Sold at auction.... The President	
		3	3	3	3	do do	
		14	14	14			June 30, 1906 14
		6	6	6	6	Sold at auction.... The President	
		2	2	2			June 30, 1906 2
		2	2	2			do 2
		1	1	1			June 5, 1906 1
		8834	8834	8834		Worn-out	do 8834
		1	1	1			do 1
		1	1	1			do 1
		178	178	178			do 178
		1	1	1			do 1
		1	1	1			do 1
		1	1	1			do 1
		113	113	113			do 113
		1	1	1			do 1
		1	1	1			do 1
			1	1			do 1
			1	1			do 1
			1	1			do 1
			2	2			do 2
			4	4			do 4

## APPENDIX B.

DESCRIPTION OF SOME RARE TROPICAL PLANTS AT THE PROPAGATING GARDENS OF THE PUBLIC GROUNDS, WASHINGTON, D. C., PREPARED BY MR. GEO. H. BROWN, LANDSCAPE GARDENER.

No. 1. *Anthurium ventricosum*.—An ornamental foliaged plant (natural order Aroideæ) from tropical America, with thick, broadly lanceolate leaves 3 feet long 7 inches wide; ventricose stem and midrib; flowers very fragrant, creamy white, shaded to a light claret color at the base of the greenish white spathe. A very rare plant, to be found only in a few collections of the United States and Europe.

No. 2. *Coccoloba pubescens*.—A curious ornamental tropical plant, said to be indigenous in the West India Islands, where it forms a large tree. The leaves are abnormally large, nearly round, averaging over 4 feet in diameter in full-grown specimens, and droop at the margins with a peculiar umbrella effect; color, dark dull green above, light green underneath, with very large prominent midrib and side ribs; veins on the upper surface of the leaves thickly coated with light brown pubescent hairs; the midrib and side ribs underneath the leaves also have a thinly pubescent coating; ornamental and showy; a peculiar plant, rarely found in any of the collections of the United States.

Nos. 3, 3. *Licuala grandis*.—Ornamental fan-leaved palms; native of tropical Asia; the margins of the leaves cleft into curious bifid lobes; very attractive decorative plants, to be found now generally in large plant collections in the United States and Europe.

Nos. 4, 4. *Kentia sanderiana*.—Very graceful slender-growing palms; pinnate, arching leaves; of comparatively recent introduction, and not yet generally grown in plant collections of the United States.

No. 5. *Acanthoriza warzewiczii*.—An ornamental foliaged palm, introduced from tropical America, and not usually found in plant collections; leaves divided at the margins into irregular lanceolate segments; color, deep green on the upper surface, silvery green underneath.

No. 6. *Vanda cœrulea*.—A very much-prized East Indian orchid; flowers light blue, borne on long spikes; generally found in all large collections of orchids in the United States and in Europe.

Nos. 7 and 8. *Lycopodiaceæ*.—Two very curious new varieties of *Lycopodiums* recently received from the Philippine Islands, and which, it is believed, have not heretofore been introduced by plant collectors into the United States.

No. 7 is a variety with many branching pendulous stems, bifurcated at the tips, now averaging 27 inches in length and about one-fourth of an inch in width; leaves linear lanceolate, appressed and imbricated on the stems; color, light green.

No. 8 is a more robust-growing variety than the preceding (No. 7), also with numerous branching, slender stems, now averaging 20 inches in length; color, dark brown, nearly black at the crown of the plant; leaves, half an inch long, broadly lanceolate, acuminate, slightly cordate at the base, thinly whorled around the stem; color, dark glossy green on upper surface, paler underneath.

Nos. 9 and 10. *Pandanus sanderi*.—Ornamental foliaged tropical plants recently introduced into the United States from England. Leaves long and narrow, pendulous, dark green, bordered with bands of bright yellow. Golden bronze tints also appear in various parts of the leaves of older specimens.

Nos. 11 and 12. *Rhapis flabelliformis*.—Ornamental palms introduced from China and Japan, and now common in all tropical plant collections of the United States and Europe. Leaves dark green, fan-shaped, and divided into from 5 to 7 segments; stems from 1 to 2 inches in diameter, cylindrical, clothed with remains of leaf sheaths, as they continue in growth upward. The rattan canes of China are said to be made from the stems of this palm.

## APPENDIX C.

LIST OF TREES AND SHRUBS IN SOME OF THE PUBLIC PARKS IN THE CITY OF WASHINGTON, D. C., GIVING THEIR BOTANICAL NAMES AND COMMON NAMES.

The locations of the trees and shrubs are indicated by numbers on the accompanying plans.

[Compiled by Mr. GEORGE H. BROWN, landscape gardener.]

## THE WHITE HOUSE GROUNDS.

Numbers.	Common name.	Botanical name.	Designation.
<i>Section 1.</i>			
1, 4, 53, 60, 62, 84, 89, 124, 125, 143, 144, 151, 161.	American ash .....	<i>Fraxinus americana</i> ...	Native deciduous tree.
2, 3, 10, 156, 165.....	European plane tree .....	<i>Platanus orientalis</i> .....	Foreign deciduous tree.
5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 19, 23, 24, 25, 27, 29, 31, 32, 45, 46, 54, 57, 59, 70, 71, 73, 74, 145, 148, 149, 150, 154, 155, 157, 158, 162, 163, 164.	American elm.....	<i>Ulmus americana</i> .....	Native deciduous tree.
16, 110, 138.....	Scarlet oak.....	<i>Quercus coccinea</i> .....	Do.
17, 139.....	Golden chain.....	<i>Cytisus laburnum</i> .....	Foreign deciduous tree.
18, 140.....	Purple beech.....	<i>Fagus sylvatica purpurea</i> .	Do.
20.....	Mixed group, Bridal wreath ( <i>Spiraea</i> ); Lilac ( <i>Syringa</i> ), and Spanish bayonet ( <i>Yucca</i> ).	.....	Native and foreign shrubs
21, 33, 45, 51, 146.....	European elm.....	<i>Ulmus campestris</i> and <i>Ulmus montana</i> .	Foreign deciduous tree.
22.....	Overcup oak.....	<i>Quercus macrocarpa</i> ...	Native deciduous tree.
26, 88, 118.....	Red maple.....	<i>Acer rubrum</i> .....	Do.
28, 82, 122, 152.....	Tulip tree .....	<i>Liriodendron tulipifera</i>	Do.
30.....	European ash .....	<i>Fraxinus excelsior</i> .....	Foreign deciduous tree.
34, 92, 107, 123.....	Mimosa tree.....	<i>Acacia nemu</i> .....	Do.
35.....	Fortunes bamboo .....	<i>Bambusa fortunei</i> .....	Foreign evergreen shrub.
36.....	Group of Japan maples ( <i>Acer polymorphum</i> ) and Bush clover ( <i>Lespedeza</i> ).	.....	Foreign deciduous shrub.
37, 87, 117.....	Hall's magnolia .....	<i>Magnolia halleana</i> .....	Do.
38, 40, 42, 44, 183, 184.	Fern-leaved beech .....	<i>Fagus sylvatica purpurea</i> .	Foreign deciduous tree.
39.....	Tiger's tail spruce.....	<i>Abies polita</i> .....	Foreign evergreen tree.
41, 77, 80.....	Nordmann's silver fir .....	<i>Abies nordmanniana</i> ...	Do.
43.....	Douglas' spruce .....	<i>Pseudotsuga douglasii</i> .	Native evergreen tree.
47.....	Pin oak .....	<i>Quercus palustris</i> .....	Native deciduous tree.
48.....	White poplar.....	<i>Populus alba nivea</i> .....	Foreign deciduous tree.
49, 61, 83, 85.....	Buckeye .....	<i>Esculus octandra</i> .....	Native deciduous tree.
50, 75, 76, 81, 90, 91, 93, 94, 105, 106, 120, 127, 128, 129, 130.	Basswood .....	<i>Tilia europea</i> and <i>Tilia americana</i> .	Do.
52, 159.....	Sugar maple.....	<i>Acer saccharum</i> .....	Do.
55, 58, 147, 160, 163.....	Silver maple .....	<i>Acer saccharinum</i> .....	Do.
63, 66, 68, 131, 133, 135, 137.	Japan cypress .....	<i>Retinospora plumosa</i> ...	Foreign evergreen tree.
64, 67, 132, 136.....	European silver fir .....	<i>Abies pectinata</i> .....	Do.
65, 134.....	Holly-leaved osmanthus .....	<i>Osmanthus ilicifolia</i> .....	Do.
69, 114.....	Bishop's cap.....	<i>Halesia tetraptera</i> .....	Native deciduous tree.
72.....	European beech.....	<i>Fagus sylvatica</i> .....	Foreign deciduous tree.
78, 100, 103.....	Oriental spruce.....	<i>Picea orientalis</i> .....	Foreign evergreen tree.
79, 102.....	Golden bell .....	<i>Forsythia</i> .....	Foreign deciduous shrub.
86.....	Double-flowering peach....	<i>Prunus persica flore plena</i> .	Foreign deciduous tree.
95, 99.....	Soulanges hybrid magnolia.	<i>Magnolia soulangeana</i> .	Do.
96, 100.....	Purple-leaved plum .....	<i>Prunus pissardii</i> .....	Do.
97, 98.....	Lovely Weigela .....	<i>Weigela amabilis</i> .....	Foreign deciduous shrub.
104.....	Russian silver fir .....	<i>Picea pichta</i> .....	Foreign evergreen tree.
108.....	Sweet gum tree.....	<i>Liquidambar styraciflua</i> .	Foreign deciduous tree.
109, 112.....	Maldenhair tree.....	<i>Ginkgo biloba</i> .....	Do.
111.....	English golden oak .....	<i>Quercus rebur concordia</i> .	Do.
120.....	Umbrella tree .....	<i>Magnolia tripetala</i> .....	Native deciduous tree.
121.....	Tartarian maple.....	<i>Acer tartaricum</i> .....	Foreign deciduous tree.
113, 153.....	Horse-chestnut.....	<i>Esculus hippocastanum</i> .	Do.

## THE WHITE HOUSE GROUNDS—Continued.

Numbers.	Common name.	Botanical name.	Designation.
<i>Section 1—Cont'd.</i>			
115.....	Box tree.....	Buxus sempervirens ...	Foreign evergreen tree.
119.....	Red oak.....	Quercus rubra.....	Native deciduous tree.
141.....	Norway maple.....	Acer platanoides.....	Do.
142.....	Mixed group of Crape myrtle (Lagerstroemia); Althea (Hibiscus); Lilac (Syringa), and Bridal wreath (Spiraea).	.....	Native and foreign deciduous shrubs.
167.....	Japanese silver bell.....	Pterostyrax hispida....	Foreign deciduous tree.
167.....	Group of Lilac (Syringa); Althea (Hibiscus); Smoke tree (Rhus cotinus), and Snowberries (Symphoricarpos).	.....	Native deciduous shrubs
168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182.	Pin oak.....	Quercus palustris.....	Native deciduous tree.
185.....	Large-flowered magnolia...	Magnolia grandiflora ..	Native evergreen tree.
<i>Section 2.</i>			
1, 2, 3, 4, 5, 74, 76, 80..	Silver maple.....	Acer saccharinum.....	Native deciduous tree.
6, 8, 13.....	Purple magnolia.....	Magnolia obovata.....	Foreign deciduous tree.
14.....	Japan storax.....	Styrax japonica.....	Do.
7.....	Sugar maple.....	Acer saccharum.....	Native deciduous tree.
9, 73.....	European plane tree.....	Platanus orientalis.....	Foreign deciduous tree.
10, 25, 50, 52, 65.....	Horse chestnut.....	Æsculus hippocastanum	Do.
11, 72.....	Japan maple.....	Acer polymorphum....	Do.
12.....	Flowering almond.....	Prunus japonica.....	Foreign deciduous shrub
15.....	White fir.....	Abies concolor.....	Native evergreen tree.
16, 20, 60.....	American arbor vitae.....	Thuja occidentalis.....	Do.
17.....	Swiss stone pine.....	Pinus cembra.....	Foreign evergreen tree.
18.....	Korean pine.....	Pinus koraiensis.....	Do.
19, 26.....	European silver fir.....	Picea pectinata.....	Do.
21, 22, 24, 66, 68, 79...	Purple beech.....	Fagus sylvatica purpurea.	Foreign deciduous tree.
23, 56.....	Japan varnish tree.....	Kœlreuteria paniculata	Do.
27.....	Flowering crab apple.....	Pyrus coronaria.....	Native deciduous tree.
28, 78.....	Norway maple.....	Acer platanoides.....	Do.
29, 47, 70.....	Austrian pine.....	Pinus austriacus.....	Foreign evergreen tree.
30, 48.....	Bhotan pine.....	Pinus excelsa.....	Do.
31.....	American elm.....	Ulmus americana.....	Native deciduous tree.
32.....	Yellow willow.....	Salix vitellina.....	Do.
33, 43.....	White pine.....	Pinus strobus.....	Native evergreen tree.
34.....	African cedar.....	Cedrus atlantica.....	Foreign evergreen tree.
35, 44, 58.....	Flowering dogwood.....	Cornus florida.....	Native deciduous tree.
36, 62.....	Japanese wych hazel.....	Hamamelis japonica...	Foreign deciduous tree.
37, 77.....	Tulip tree.....	Liriodendron tulipifera	Native deciduous tree.
38.....	Judas tree.....	Cercis canadensis.....	Do.
40, 41.....	Mimosa tree.....	Acacia nemu.....	Foreign deciduous tree.
42.....	European white birch.....	Betula alba.....	Do.
45.....	European hornbeam.....	Carpinus betulus.....	Foreign deciduous tree.
46.....	Cedar of Lebanon.....	Cedrus libani.....	Foreign evergreen tree.
51, 55.....	Indian bean.....	Catalpa bignonioides...	Native deciduous tree.
53.....	English walnut.....	Juglans regia.....	Foreign deciduous tree.
61, 75.....	Yellow wood.....	Cladrastis tinctoria.....	Native deciduous tree.
54.....	European ash.....	Fraxinus excelsior.....	Foreign deciduous tree.
57.....	Fern-leaved beech.....	Fagus heterophylla.....	Do.
64.....	Ash-leaved maple.....	Acer negundo.....	Native deciduous tree.
67.....	Wiers maple.....	Acer saccharinum wieri.	Do.
69.....	Japanese flowering cherry..	Prunus pseudo-cerasus.	Foreign deciduous tree.
71.....	Soulanges hybrid magnolia..	Magnolia soulangeana.	Do.
81, 82, 83.....	Box wood.....	Buxus sempervirens....	Foreign evergreen shrub.
84.....	Large-flowering magnolia..	Magnolia grandiflora...	Native evergreen tree.
<i>Section 3.</i>			
1, 3, 5, 7.....	Red-flowering dogwood....	Cornus florida rubra ...	Native deciduous tree.
2.....	Japanese flowering cherry.	Prunus pseudo-cerasus.	Foreign deciduous shrub
4.....	Japan privet.....	Ligustrum ibota.....	Do.
6, 8, 9.....	Japan snowball.....	Viburnum plicatum....	Do.
10, 61.....	Flowering crab apple.....	Pyrus coronarius.....	Native deciduous tree.
11.....	Imperial tree.....	Paulownia imperialis..	Foreign deciduous tree.
12, 18, 26, 29, 36.....	Silver-leaved linden.....	Tilia europea.....	Do.
13, 62.....	Horse chestnut.....	Æsculus hippocastanum	Do.
14, 15, 21.....	White poplar.....	Populus alba.....	Native deciduous tree.
16, 46.....	Purple beech.....	Fagus sylvatica purpurea.	Foreign deciduous tree.



## THE WHITE HOUSE GROUNDS—Continued.

Numbers.	Common name.	Botanical name.	Designation.
<i>Section 3—Cont'd.</i>			
17.....	Mixed group of Deutzia, Spirea, hibes, lilac and crape myrtle.	.....	Native and foreign deciduous shrubs.
19.....	Black walnut.....	Juglans nigra.....	Native deciduous tree.
20.....	European plane tree.....	Platanus orientalis.....	Foreign deciduous tree.
22.....	English elm.....	Ulmus campestris.....	Do.
23.....	American linden.....	Tilia americana.....	Native deciduous tree.
24.....	White oak.....	Quercus alba.....	Do.
25.....	Swamp white oak.....	Quercus bicolor.....	Do.
27.....	Fern-leaved beech.....	Fagus heterophylla.....	Foreign deciduous tree.
28.....	Camperdown weeping elm.....	Ulmus scabra pendula.....	Do.
30.....	Mixed group of lilacs, Deutzias, cydonias, forsythias, and hydrangea paniculata grandiflora.	.....	Native and foreign deciduous shrubs.
31, 35, 39.....	Norway maple.....	Acer platanoides.....	Foreign deciduous tree.
32.....	Mixed group of Deutzia, Spirea, Lespedeza and lilacs.	.....	Native and foreign deciduous shrubs.
33.....	Silver maple.....	Acer saccharinum.....	Native deciduous tree.
34.....	Mixed group of Deutzia and lilacs, cedar of Lebanon and magnolia grandiflora also in this group.	.....	Native and foreign deciduous trees and deciduous shrubs.
37.....	Japan varnish tree.....	Koelreuteria paniculata.	Foreign deciduous tree.
38.....	Mimosa tree.....	Acacia nemu.....	Do.
40.....	European hornbeam.....	Carpinus betulus.....	Do.
41.....	Tartarian maple.....	Acer tartarica.....	Do.
42.....	Mixed group of Deutzia, Spirea, and crape myrtle.	.....	Foreign and native deciduous shrubs.
43.....	Mixed group of Deutzia and Jasminum nudiflorum.	.....	Do.
44.....	Locust.....	Robinia pseudo-acacia.....	Native deciduous tree.
45.....	Naked jessamine.....	Jasminum nudiflorum.....	Foreign deciduous shrub.
47.....	Weeping dogwood.....	Cornus florida pendula.....	Native deciduous tree.
48.....	Red maple.....	Acer rubrum.....	Do.
49.....	Smooth sumach.....	Rhus glabra.....	Do.
50.....	Indian bean.....	Catalpa bignonioides.....	Do.
51.....	Scarlet oak.....	Quercus coccinea.....	Do.
52.....	Laurel oak.....	Quercus imbricaria.....	Do.
53, 58.....	Lilac.....	Syringa vulgaris.....	Native deciduous shrub.
54, 60.....	Sweet gum tree.....	Liquidambar styraciflua.	Native deciduous tree.
55.....	Honey locust.....	Gleditsia triacanthos.....	Do.
56, 57, 59, 63.....	Silver maple.....	Acer saccharinum.....	Do.
64.....	Tulip tree.....	Liriodendron tulipifera.....	Do.
65, 68.....	Fortune's bamboo.....	Bambusa fortunei.....	Foreign deciduous shrub.
66, 83.....	Oriental spruce.....	Picea orientalis.....	Foreign evergreen tree.
67.....	Cedar of Lebanon.....	Cedrus libani.....	Do.
69.....	Tiger's-tail spruce.....	Abies polita.....	Do.
70.....	Colorado blue spruce.....	Picea pungens.....	Native evergreen tree.
71.....	Bhotan pine.....	Pinus excelsa.....	Foreign evergreen tree.
72.....	Japan quince.....	Cydonia japonica.....	Foreign deciduous shrub.
73.....	Group of spireas.....	Boxwood and herbaceous peony.	Native and foreign deciduous shrubs.
74.....	Japanese storax tree.....	Peterostyrax hispida.....	Foreign deciduous tree.
75, 76.....	California privet.....	Ligustrum ovalifolium.....	Foreign deciduous shrub.
77.....	Japan mahonia.....	Mahonia japonica.....	Do.
78.....	Tree peony.....	Peony moutan.....	Do.
79.....	Golden-leaved oak.....	Quercus robur concordia.	Foreign deciduous tree.
80.....	English walnut.....	Juglans regia.....	Do.
81, 84.....	Garland flowered spirea.....	Spirea prunifolia.....	Foreign deciduous shrub.
82.....	Crape myrtle.....	Lagerstroemia indica.....	Do.
85.....	Boxwood.....	Buxus sempervirens.....	Foreign evergreen shrub.
86.....	Trifoliate orange.....	Citrus trifoliata.....	Foreign deciduous tree.
<i>Section 4.</i>			
1, 2, 3, 4, 17, 18, 22, 31, 50.....	Silver maple.....	Acer saccharinum.....	Native deciduous tree.
5.....	Colorado blue spruce.....	Picea pungens.....	Native evergreen tree.
6.....	American chestnut.....	Castanea americana.....	Native deciduous tree.
7.....	Kentucky coffee tree.....	Gymnocladus canadensis.	Do.
8, 39.....	Overcup oak.....	Quercus macrocarpa.....	Do.
9.....	Turkey oak.....	Quercus cerris.....	Foreign deciduous tree.
10.....	Chestnut oak.....	Quercus prinus.....	Native deciduous tree.
11.....	Red oak.....	Quercus rubra.....	Do.

## THE WHITE HOUSE GROUNDS—Continued.

Numbers.	Common name.	Botanical name.	Designation.
<i>Section 4—Cont'd.</i>			
12, 16.....	Overcup oak.....	<i>Quercus macrocarpa</i> ..	Native deciduous tree.
13, 19, 27, 41, 45, 62...	Horse-chestnut.....	<i>Æsculus hippocastanum</i> .	Foreign deciduous tree.
14, 29.....	Sycamore maple.....	<i>Acer pseudo-platanus</i> ..	Do.
20.....	Japan judas.....	<i>Cercis japonica</i> .....	Foreign deciduous shrub.
21.....	Japanese weeping cherry ..	<i>Cerasus japonica pendula</i> .	Foreign deciduous tree.
23.....	Fern-leaved beech .....	<i>Fagus heterophylla</i> .....	Do.
24.....	American beech.....	<i>Fagus americana</i> .....	Native deciduous tree.
25, 43, 47.....	American ash .....	<i>Fraxinus americana</i> .....	Do.
26.....	Ash-leaved maple.....	<i>Acer negundo</i> .....	Do.
28.....	Swamp white oak .....	<i>Quercus bicolor</i> .....	Do.
30, 54, 60.....	Sugar maple.....	<i>Acer saccharum</i> .....	Do.
32.....	Japanese flowering cherry ..	<i>Prunus cerasus japonica</i> .	Foreign deciduous tree.
33.....	Japan varnish tree .....	<i>Kolreuteria paniculata</i> .	Do.
34.....	Flowering crab apple .....	<i>Pyrus coronarius</i> .....	Native deciduous tree.
35.....	Large mixed group of lilac, Missouri currant, boxwood, spice bush, pearl bush, philadelphus, flowering almond, hibiscus, and tree peony.	.....	Foreign and native deciduous shrubs.
36.....	Evergreen group, retinospora, cedrus, yuccas.	.....	Foreign and native evergreen shrubs.
37 and 38 .....	Groups (connected), <i>Pyrus coronaria</i> , <i>Ptelea trifoliata</i> , <i>Spiraea reevesii</i> , <i>Lagerstroemia indica</i> .	.....	Foreign and native deciduous shrubs.
40.....	European plane tree .....	<i>Platanus orientalis</i> .....	Foreign deciduous tree.
42.....	Cornelian cherry.....	<i>Cornus mascula</i> .....	Do.
44.....	European hornbeam .....	<i>Carpinus betulus</i> .....	Do.
46.....	Bishop's cap.....	<i>Halesia tetraptera</i> .....	Native deciduous tree.
48.....	Bhotan pine.....	<i>Pinus excelsa</i> .....	Foreign evergreen tree.
49.....	Tulip tree .....	<i>Liriodendron tulipifera</i>	Native deciduous tree.
50.....	Group of American arborescences.	.....	Native evergreen tree.
51.....	Norway spruce .....	<i>Picea excelsa</i> .....	Foreign evergreen tree.
52.....	Group, hibiscus, aralia, jasmine, magnolia, and spiraea.	.....	Native and foreign deciduous shrubs.
55.....	Group, aucuba, Japan maples, Deutzias, and Spiræas.	.....	Do.
56.....	Persian lilac.....	<i>Syringa persica</i> .....	Foreign deciduous shrub.
57.....	European larch .....	<i>Larix europea</i> .....	Do.
58, 64.....	Buckeye.....	<i>Æsculus octandra</i> .....	Native deciduous tree.
59.....	Cranberry shrub.....	<i>Viburnum opulus</i> .....	Native deciduous shrub.
61.....	Group, flowering almond, purple barberry, box, and philadelphus.	.....	Native and foreign deciduous shrubs.
63.....	Group of mock orange.....	<i>Syringa coronarius</i> .....	Foreign deciduous shrub.
<i>Section 5.</i>			
1.....	Group (3) smoke trees.....	<i>Rhus cotinus</i> .....	Foreign deciduous tree.
2.....	Silver linden .....	<i>Tilia europea argentea</i> ..	Do.
3.....	European plane tree .....	<i>Platanus orientalis</i> .....	Do.
4, 5, 7, 9, 21, 131, 137, 138, 141, 142, 144, 147.	American elm.....	<i>Ulmus americana</i> .....	Native deciduous tree.
6, 12, 13, 15, 59, 74....	Purple lilac .....	<i>Syringa vulgaris</i> .....	Native and foreign deciduous shrub.
8.....	Group, hibiscus, boxwood, lilac, Deutzia.	.....	Do.
10.....	Willow oak.....	<i>Quercus phellos</i> .....	Native deciduous tree.
11, 19.....	Boxwood.....	<i>Buxus sempervirens</i> .....	Foreign deciduous shrub.
14.....	Rough-leaved Deutzia .....	<i>Deutzia scabra</i> .....	Do.
16, 75, 85.....	Japan maple .....	<i>Acer polymorphum</i> .....	Foreign deciduous tree.
17.....	Laurel oak .....	<i>Quercus imbricaria</i> .....	Native deciduous tree.
18.....	Scarlet oak .....	<i>Quercus coccinea</i> .....	Do.
20, 50.....	Japan ginkgo .....	<i>Ginkgo biloba</i> .....	Foreign deciduous tree.
22, 124, 140, 143.....	Sugar maple.....	<i>Acer saccharum</i> .....	Native deciduous tree.
23, 25, 45, 109, 123, 145	Norway maple .....	<i>Acer platanoides</i> .....	Foreign deciduous tree.
24.....	Althea.....	<i>Hibiscus syriacus</i> .....	Foreign deciduous shrub.
26, 27.....	Japan varnish tree .....	<i>Kolreuteria paniculata</i> .	Foreign deciduous tree.
28.....	Sycamore maple .....	<i>Acer pseudo-platanus</i> ..	Do.
29, 215, 133, 134.....	American ash .....	<i>Fraxinus americana</i> .....	Native deciduous tree.
30, 44, 60.....	Japanese pagoda tree .....	<i>Sophora japonica</i> .....	Foreign deciduous tree.
31, 32, 33.....	Deciduous cypress.....	<i>Taxodium distichum</i> ...	Native deciduous tree.
34.....	Red maple .....	<i>Acer rubrum</i> .....	Do.

THE WHITE HOUSE GROUNDS—Continued.

Numbers.	Common name.	Botanical name.	Designation.
Section 5—Cont'd.			
35, 100.....	Imperial tree.....	Paulownia imperialis ..	Foreign deciduous tree.
36, 37, 38, 132.....	Overcup oak.....	Quercus macrocarpa ...	Native deciduous tree.
39, 114, 126.....	Ash-leaved maple.....	Acer negundo.....	Do.
40, 139.....	English field maple.....	Acer campestria.....	Foreign deciduous tree.
41.....	White oak.....	Quercus alba.....	Native deciduous tree.
42, 43, 46, 47, 48, 49, 105, 106, 107, 111, 112.....	Horse-chestnut.....	Æsculus hippocastanum.	Foreign deciduous tree.
51, 89, 103, 104.....	Norway spruce.....	Picea excelsa.....	Foreign evergreen tree.
52, 54.....	Hemlock fir.....	Tsuga canadensis.....	Do.
53.....	English yew tree.....	Taxus baccata.....	Do.
55, 58, 70, 95, 101, 102.....	American arbor vitæ.....	Thuja occidentalis.....	Do.
56.....	Tartarian honeysuckle.....	Lonicera tartarica.....	Foreign evergreen shrub.
57.....	Group, lilac, Weigela, symphoricarpus, box, Arbor vitæ.....	.....	Native and foreign deciduous shrubs.
61.....	Purple-flowering magnolia.....	Magnolia obovata.....	Foreign deciduous shrub.
62.....	Boxwood.....	Buxus sempervirens ..	Foreign evergreen shrub.
63, 64, 93, 94.....	Soulanges magnolia.....	Magnolia soulangeana ..	Foreign deciduous tree.
65, 68.....	English holly.....	Ilex aquifolium.....	Foreign evergreen tree.
66, 91, 99.....	Irish yew.....	Taxus hibernica fastigiata.	Do.
67.....	Japan dogwood.....	Cornus japonica.....	Foreign deciduous tree.
69.....	Camperdown elm.....	Ulmus scabra pendula..	Do.
71, 88.....	Reeves spirea.....	Spirea reeveall.....	Foreign deciduous shrub.
72, 87.....	Cranberry shrub.....	Viburnum opulus.....	Native deciduous shrub.
73.....	Panicle-flowering hydrangea.....	Hydrangea paniculata grandiflora.	Foreign deciduous shrub.
76.....	Group of Weigela and Forsythia.....	.....	Do.
77.....	Flowering crab apple.....	Pyrus coronaria.....	Native deciduous tree.
78, 80.....	European weeping beech ..	Fagus sylvatica pendula	Foreign deciduous tree.
79, 81, 95.....	Tamarisk.....	Tamarix gallica.....	Foreign deciduous shrub.
82, 84.....	Lovely weigela.....	Weigela amabilis.....	Do.
83.....	Golden bell.....	Forsythia viridissima ..	Do.
90.....	Nordmann's silver fir.....	Abies nordmanniana....	Foreign evergreen tree.
91.....	American holly tree.....	Ilex opaca.....	Native evergreen tree.
108.....	Bhotan pine.....	Pinus excelsa.....	Foreign evergreen tree.
110, 117, 121.....	European ash.....	Fraxinus excelsior.....	Foreign deciduous tree.
113.....	Buckeye.....	Æsculus octandra.....	Native deciduous tree.
116.....	Osage orange tree.....	Maclura aurantiaca.....	Do.
118.....	Swamp white oak.....	Quercus bicolor.....	Do.
119, 120.....	Pin oak.....	Quercus palustris.....	Do.
122.....	Hop tree.....	Ptelea trifoliata.....	Do.
126.....	American white birch.....	Betula alba.....	Do.
127, 128, 129.....	Deciduous cypress.....	Taxodium distichum...	Do.
130.....	Chestnut oak.....	Quercus prinus.....	Do.
135, 136.....	Mist tree (smoke tree).....	Rhus cotinus.....	Foreign deciduous tree.
146.....	Group of althea.....	Hibiscus syriacus.....	Foreign deciduous shrub.
148.....	Group of purple lilac.....	Syringa vulgaris.....	Do.
149.....	Cut-leaved Japanese maple.....	Acer polymorphum dissectum atropurpureum.	Foreign deciduous tree.

LAFAYETTE PARK.

Section 1.			
1, 12, and 14.....	Silver maple.....	Acer saccharinum.....	Native deciduous tree.
2 and 3.....	Red maple.....	Acer rubrum.....	Do.
4.....	Japan quince.....	Cydonia japonica.....	Foreign deciduous shrub.
6.....	Honeysuckle shrub.....	Lonicera tartarica.....	Do.
7.....	Paulownia.....	Paulownia imperialis ..	Do.
8 and 9.....	Oriental fir.....	Picea orientalis.....	Foreign evergreen tree.
10 and 11.....	European linden.....	Tilia europea.....	Foreign deciduous tree.
13.....	American holly.....	Ilex opaca.....	Native evergreen tree.
15.....	Red ash.....	Fraxinus pubescens....	Native deciduous tree.
Section 2.			
1, 2, and 18.....	Oriental fir.....	Picea orientalis.....	Foreign evergreen tree.
3.....	Arbor vitæ.....	Thuja occidentalis.....	Native evergreen shrub.
4.....	Flowering dogwood.....	Cornus florida.....	Native deciduous tree.
5.....	Wild black cherry.....	Prunus serotina.....	Do.
6.....	Virginia fringe tree.....	Chionanthus virginica ..	Native deciduous shrub.
7.....	Weigela.....	Weigela amabilis.....	Foreign deciduous shrub.
8.....	Garland-flowered spirea.....	Spirea prunifolia.....	Do.
9.....	American azalea.....	Azalia nudiflora.....	Native deciduous shrub.
9.....	Rough-leaved Deutzia.....	Deutzia scabra.....	Foreign deciduous shrub.

## LAFAYETTE PARK—Continued.

Numbers.	Common name.	Botanical name.	Designation.
<i>Section 2—Cont'd.</i>			
9.....	Box .....	Buxus sempervirens.....	Foreign evergreen shrub.
10, 11, 13, 14, and 16.....	American elm.....	Ulmus americana .....	Native deciduous tree.
12 and 15 .....	American holly .....	Ilex opacar.....	Native evergreen tree.
17.....	Honeysuckle shrub.....	Lonicera tartarica.....	Foreign deciduous shrub.
<i>Section 3.</i>			
1 and 2 .....	Box .....	Buxus sempervirens.....	Foreign evergreen shrub.
3.....	Sugar maple.....	Acer saccharum .....	Native deciduous tree.
<i>Section 4.</i>			
1.....	Silver maple.....	Acer saccharinum.....	Native deciduous tree.
2.....	Red ash .....	Fraxinus pubescens.....	Do.
3.....	American elm.....	Ulmus americana .....	Do.
<i>Section 5.</i>			
1.....	Silver maple.....	Acer saccharinum.....	Native deciduous tree.
2.....	Japan snowball shrub.....	Viburnum plicatum.....	Foreign deciduous shrub.
3.....	American holly .....	Ilex opaca.....	Native evergreen tree.
4.....	American green ash.....	Fraxinus viridis.....	Native deciduous tree.
5.....	Syrian hibiscus.....	Hibiscus syriacus.....	Foreign deciduous shrub.
6.....	Box .....	Buxus sempervirens.....	Foreign evergreen shrub.
7.....	American elm.....	Ulmus americana .....	Native deciduous tree.
8.....	Purple-flowered magnolia..	Magnolia obovata .....	Foreign deciduous shrub.
<i>Section 6.</i>			
1.....	English golden yew.....	Taxus baccata aurea ...	Foreign evergreen tree.
2.....	Box .....	Buxus sempervirens.....	Foreign evergreen shrub.
<i>Section 7.</i>			
1, 3, 5, and 6 .....	Box .....	Buxus sempervirens.....	Foreign evergreen shrub.
2.....	Sugar maple.....	Acer saccharum .....	Native deciduous tree.
4.....	Camperdown weeping elm..	Ulmus scabra pendula..	Foreign deciduous tree.
<i>Section 8.</i>			
1, 7, and 9 .....	American elm.....	Ulmus americana .....	Native deciduous tree.
2 and 3 .....	Garland-flowered Spirea ...	Spirea prunifolia .....	Foreign deciduous shrub.
4.....	Silver maple.....	Acer saccharinum.....	Native deciduous tree.
5 and 6 .....	Box .....	Buxus sempervirens.....	Foreign evergreen shrub.
8.....	Hemlock fir .....	Tsuga canadensis .....	Native evergreen tree.
<i>Section 9.</i>			
1 and 4 .....	Box .....	Buxus sempervirens.....	Foreign evergreen shrub.
2.....	Purple-flowered magnolia..	Magnolia obovata .....	Foreign deciduous shrub.
3.....	Hemlock fir .....	Tsuga canadensis .....	Native evergreen tree.
5.....	Sugar maple.....	Acer saccharum.....	Native deciduous tree.
6.....	American Arbor vitae .....	Thuja occidentalis .....	Native evergreen shrub.
<i>Section 10.</i>			
1.....	Japan cedar.....	Cryptomeria japonica ..	Foreign evergreen tree.
2 and 3 .....	Irish yew.....	Taxus baccata fastigiata	Foreign evergreen shrub.
4.....	Box .....	Buxus sempervirens.....	Do.
<i>Section 11.</i>			
1.....	Bull bay tree .....	Magnolia grandiflora...	Native evergreen tree.
2.....	Mock orange .....	Philadelphus corona- rius.	Foreign deciduous shrub.
3.....	Irish yew .....	Taxus baccata fastigiata	Foreign evergreen shrub.
<i>Section 12.</i>			
1 and 8 .....	English yew.....	Taxus baccata.....	Foreign evergreen tree.
2 and 7 .....	Box .....	Buxus sempervirens.....	Foreign evergreen shrub.
3.....	Reeve's Spirea .....	Spirea reevesianum .....	Foreign deciduous shrub.
4.....	Honeysuckle shrub .....	Lonicera tartarica.....	Do.
5.....	Common privet .....	Ligustrum vulgare.....	Foreign evergreen shrub.
6.....	Japan quince.....	Cydonia japonica .....	Foreign deciduous shrub.
9.....	American Arbor vitae .....	Thuja occidentalis .....	Native evergreen shrub.
10, 11, and 12.....	American elm.....	Ulmus americana .....	Native deciduous tree.
13.....	Virginia fringe tree .....	Chionanthus virginica ..	Native deciduous shrub.
14.....	Sugar maple.....	Acer saccharum.....	Do.
<i>Section 13.</i>			
1.....	English yew .....	Taxus baccata.....	Foreign evergreen tree.
2.....	Box .....	Buxus sempervirens ...	Foreign evergreen shrub.

## LAFAYETTE PARK—Continued.

Numbers.	Common name.	Botanical name.	Designation.
<i>Section 13—Cont'd.</i>			
3.....	Honeysuckle shrub .....	Lonicera tartarica .....	Foreign deciduous shrub.
4.....	Garland-flowered Spirea .....	Spirea prunifolia .....	Do.
5.....	Rough-leaved Deutzia .....	Deutzia scabra .....	Do.
<i>Section 14.</i>			
1 and 2 .....	English golden yew .....	Taxus baccata aurea ...	Foreign evergreen tree.
3.....	Box .....	Buxus sempervirens ...	Foreign evergreen shrub.
<i>Section 15.</i>			
1 and 2 .....	American Arbor vitæ .....	Thuja occidentalis .....	Native evergreen shrub.
3.....	Irish yew .....	Taxus baccata fastigi- ata.	Foreign evergreen shrub.
4.....	Japan quince .....	Cydonia japonica .....	Foreign deciduous shrub.
5.....	Spanish oak .....	Quercus digitata .....	Native deciduous tree.
6.....	Silver maple .....	Acer saccharinum .....	Do.
7.....	Sugar maple .....	Acer saccharum .....	Do.
8.....	American elm .....	Ulmus americana .....	Do.
<i>Section 16.</i>			
1, 2, and 3.....	Sugar maple .....	Acer saccharum .....	Native deciduous tree.
4.....	American elm .....	Ulmus americana .....	Do.
<i>Section 17.</i>			
1.....	Box .....	Buxus sempervirens....	Foreign evergreen shrub.
2.....	Bald cypress .....	Taxodium distichum....	Native deciduous tree.
<i>Section 18.</i>			
1, 12, and 14.....	Sugar maple .....	Acer saccharum .....	Native deciduous tree.
2, 8, and 10.....	Silver maple .....	Acer saccharinum .....	Do.
5, 6, and 7.....	Box .....	Buxus sempervirens ...	Foreign evergreen shrub.
4.....	Purple-flowered magnolia..	Magnolia obovata .....	Foreign deciduous shrub.
9.....	Hemlock fir .....	Tsuga canadensis.....	Native evergreen tree.
11.....	Fringe tree .....	Chionanthus virginica ..	Native deciduous shrub.
13.....	European larch .....	Larix europea .....	Foreign deciduous shrub.
15 and 21.....	American arbor vitæ .....	Thuja occidentalis .....	Native evergreen shrub.
16 and 20.....	Colorado blue spruce.....	Picea pungens.....	Native evergreen tree.
17, 18, and 19 .....	Nordmann's silver fir .....	Abies nordmanniana....	Foreign evergreen tree.
<i>Section 19.</i>			
1.....	Box .....	Buxus sempervirens....	Foreign evergreen shrub.
2.....	White pine .....	Pinus strobus .....	Native evergreen shrub.
3.....	Sugar maple .....	Acer saccharum .....	Native deciduous tree.
4.....	Spanish chestnut.....	Castanea vesca .....	Foreign deciduous tree.
5.....	English oak .....	Quercus robur .....	Do.
6.....	Golden bell shrub.....	Forsythia viridissima....	Foreign deciduous shrub.
<i>Section 20.</i>			
1 and 7.....	Silver maple .....	Acer saccharinum .....	Native deciduous tree.
2.....	Southern catalpa.....	Catalpa bignonioides....	Do.
3.....	Large-flowered magnolia...	Magnolia grandiflora...	Native evergreen tree.
4.....	Irish yew .....	Taxus baccata fastigiata	Foreign evergreen shrub.
5.....	Norway maple .....	Acer platanoides .....	Foreign deciduous tree.
6 and 12.....	Ash-leaved maple .....	Negundo aceroides.....	Native deciduous tree.
8.....	Purple-leaved beech.....	Fagus sylvatica pur- purea.	Foreign deciduous tree.
9.....	American holly .....	Ilex opaca .....	Native evergreen tree.
10 and 11.....	Box .....	Buxus sempervirens....	Foreign evergreen shrub.
13.....	Fringe tree .....	Chionanthus virginica ..	Native deciduous shrub.
<i>Section 21.</i>			
1 and 9.....	Silver maple .....	Acer saccharinum .....	Native deciduous tree.
2.....	Box .....	Buxus sempervirens....	Foreign evergreen shrub.
3 and 4.....	Horse chestnut .....	Æsculus hippocastanum	Foreign deciduous tree.
5.....	Bald cypress .....	Taxodium distichum....	Native deciduous tree.
6 and 7.....	Large-flowered magnolia...	Magnolia grandiflora...	Native evergreen tree.
8.....	Hemlock fir .....	Tsuga canadensis.....	Native evergreen shrub.
10.....	European hornbeam .....	Carpinus betulus .....	Foreign deciduous shrub.
<i>Section 22.</i>			
1.....	Box .....	Buxus sempervirens....	Foreign evergreen shrub.
2 and 7.....	Large-flowered magnolia ..	Magnolia grandiflora...	Native evergreen tree.
3 and 4.....	White pine .....	Pinus strobus .....	Do.
5.....	American linden .....	Tilia americana .....	Native deciduous tree.

LAFAYETTE PARK—Continued.

Numbers.	Common name.	Botanical name.	Designation.
Section 22—Cont'd.			
8 and 9.....	European ash .....	Fraxinus excelsior .....	Foreign deciduous tree.
10.....	Norway spruce fir .....	Picea excelsa.....	Foreign evergreen tree.
11.....	Cedar of Lebanon .....	Cedrus libani .....	Do.
12.....	Sugar maple.....	Acer saccharum.....	Native deciduous tree.
Section 23.			
1.....	Japan cedar .....	Cryptomeria japonica ..	Foreign evergreen tree.
2 and 4.....	Box .....	Buxus sempervirens....	Foreign evergreen shrub.
8.....	Fern-leaved beech .....	Fagus heterophylla ....	Foreign deciduous shrub.
6.....	American beech.....	Fagus ferruginea.....	Native deciduous tree.
Section 24.			
1 and 3.....	Box .....	Buxus sempervirens ...	Foreign evergreen shrub.
2 and 4.....	Purple-flowered magnolia..	Magnolia obovata.....	Foreign deciduous shrub.
6.....	Hemlock fir .....	Tsuga canadensis.....	Native evergreen tree.
7, 8, 9, 10 and 14.....	Silver maple.....	Acer saccharinum.....	Native deciduous shrub.
11.....	Horse chestnut.....	Æsculus hippocastanum	Foreign deciduous tree.
12.....	White pine .....	Pinus strobus.....	Native evergreen tree.
13.....	Sugar maple.....	Acer saccharum.....	Native deciduous tree.
15.....	American white birch.....	Betula populifolia.....	Do.
16.....	Reeves spirea.....	Spirea reevesianum ....	Foreign deciduous shrub.
17.....	English holly .....	Ilex aquifolium .....	Foreign evergreen tree.
Section 25.			
1.....	European ash .....	Fraxinus excelsior.....	Foreign deciduous tree.
2 and 3 .....	Irish yew.....	Taxus baccata fastigiata	Foreign evergreen tree.
4.....	Sugar maple.....	Acer saccharum.....	Native deciduous tree.
5.....	Nordmann's silver fir .....	Abies nordmanniana...	Foreign evergreen tree.
6, 7, and 9 .....	Oriental spruce fir.....	Picea orientalis.....	Do.
8.....	Ash-leaved maple .....	Negundo aceroides.....	Native deciduous tree.
10 and 11 .....	Norway maple.....	Acer platanoides.....	Foreign deciduous tree.
12.....	American beech.....	Fagus ferruginea.....	Native deciduous tree.
13.....	Hemlock fir .....	Tsuga canadensis .....	Native evergreen tree.

[Trees planted near curb line of streets bounding Lafayette Park.]

Pennsylvania ave- nue, between Ro- chambeau and Lafayette statues (from west to east):			
1, 2, 3, 4, 10, 14, 15, 17, and 18.	American elm .....	Ulmus americana .....	Native deciduous tree.
5, 6, 7, 11, 12, 13, 16, 20, 21, 22, 23, and 24.	European elm .....	Ulmus campestris .....	Foreign deciduous tree.
8.....	Norway maple .....	Acer platanoides .....	Do.
9.....	Red ash .....	Fraxinus pubescens....	Native deciduous tree.
19.....	Green ash .....	Fraxinus viridis.....	Do.
From Lafayette Statue to H street north:			
1, 2, and 8 .....	American elm .....	Ulmus americana .....	Native deciduous tree.
3.....	American linden .....	Tilia americana .....	Do.
4.....	Sycamore maple.....	Acer pseudo-platanus ..	Foreign deciduous tree.
5, 6, and 7 .....	Norway maple.....	Acer platanoides .....	Do.
H street, from Madl- son place to Jack- son place:			
9, 10, 11, 12, 13, 16, 17, and 18.	European elm .....	Ulmus campestris .....	Do.
14, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, and 32.	American elm .....	Ulmus americana .....	Native deciduous tree.
15.....	Sycamore maple.....	Acer pseudo-platanus ..	Foreign deciduous tree.
Jackson place, from H street south to Pennsylvania avenue, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16.			
	Ginkgo tree .....	Salisburia adiantifolia..	Do.



## FRANKLIN PARK.

Numbers.	Common name.	Botanical name.	Designation.
1, 2, 3, 16, 97.....	Japan quince.....	Cydonia japonica .....	Foreign deciduous shrub.
4, 18, 19, 20, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 71, 72, 73, 74, 75, 76, 77, 78, 79.	Silver maple .....	Acer saccharinum.....	Native deciduous tree.
5, 133.....	Horse-chestnut.....	Æsculus hippocastanum	Foreign deciduous tree.
6, 7, 36, 39, 43, 44, 45, 46, 47, 48, 50, 57, 61, 62, 63, 64, 65, 70, 112, 128, 158, 166.	Norway maple .....	Acer platanoides .....	Do.
8, 13, 15, 80, 86, 90, 106, 135, 144.	American linden .....	Tilia americana .....	Native deciduous tree.
9.....	Sycamore maple.....	Acer pseudo-platanus ..	Foreign deciduous tree.
10.....	Varnish tree.....	Kœlreuteria paniculata	Do.
11.....	White poplar.....	Populus alba .....	Do.
12, 58, 125, 129, 130, 134, 155, 156.	European elm .....	Ulmus scabra.....	Do.
14, 60, 126, 162.....	European linden .....	Tilia europea.....	Do.
17, 21, 55, 96, 100, 109, 119, 122, 124, 153, 169.	Deutzia shrub .....	Deutzia.....	Foreign deciduous shrub.
23, 38.....	Chinese jessamine.....	Jasminum nudiflorum ..	Do.
37.....	Maidenhair tree.....	Ginkgo biloba.....	Foreign deciduous tree.
40.....	Nordmann fir .....	Abies nordmanniana...	Foreign evergreen tree.
41, 49, 66, 82, 138.....	Sugar maple.....	Acer saccharum .....	Native deciduous tree.
42.....	European ash.....	Fraxinus excelsior.....	Foreign deciduous tree.
44.....	Tulip tree.....	Liriodendron tulipifera.	Native deciduous tree.
51, 147. ....	Panicked hydrangea.....	Hydrangea paniculata grandiflora.	Foreign deciduous shrub.
52, 53, 69, 95, 103, 115, 141, 167.	Golden bell.....	Forsythia viridissima ..	Do.
54, 101.....	Cranberry bush .....	Viburnum opulus.....	Do.
56, 59, 85, 87, 91, 108, 136, 142, 169, 170.	American elm .....	Ulmus americana .....	Native deciduous tree.
67.....	Cucumber tree .....	Magnolia acuminata ...	Do.
68.....	Thunberg's barberry .....	Berberis thunbergii ...	Foreign deciduous shrub.
81.....	White oak .....	Quercus alba .....	Native deciduous tree.
83, 111, 121, 149.....	English field maple .....	Acer campestre.....	Foreign deciduous tree.
84.....	Double-flowering cherry ...	Cerasus avium flora plena.	Do.
88.....	Swamp white oak .....	Quercus platanoides....	Native deciduous tree.
89, 116.....	Imperial tree.....	Paulownia imperialis ..	Foreign deciduous tree.
92.....	White pine .....	Pinus strobus.....	Native evergreen tree.
93.....	American arbor vitæ.....	Thuja occidentalis.....	Do.
94, 139.....	Buckeye.....	Æsculus glabra.....	Native deciduous tree.
98, 163.....	Fern-leaved beech.....	Fagus heterophylla .....	Foreign deciduous tree.
102.....	Judas tree .....	Cercis canadensis .....	Native deciduous tree.
104, 107, 123, 131, 168.	Purple-flowering magnolia ..	Magnolia obovata.....	Foreign deciduous shrub.
105, 117, 143, 152.....	Reeve's Spirea.....	Spirea reevesii .....	Do.
110, 127.....	White birch .....	Betula alba.....	Foreign deciduous tree.
113, 161.....	Purple beech .....	Fagus sylvatica purpurea.	Do.
114.....	White ash .....	Fraxinus americana ...	Native deciduous tree.
118.....	Black walnut .....	Juglans nigra .....	Do.
120, 157, 159.....	Purple lilac.....	Syringa vulgaris.....	Foreign deciduous shrub.
132.....	Yulan .....	Magnolia conspicua.....	Foreign deciduous tree.
137.....	Chestnut oak .....	Quercus prinus.....	Native deciduous tree.
140.....	American holly .....	Ilex opaca.....	Native evergreen tree.
145, 160.....	Scarlet oak .....	Quercus coccinea.....	Native deciduous tree.
146.....	Garland flower.....	Spirea prunifolia .....	Foreign deciduous shrub.
148, 164.....	English beech.....	Fagus sylvatica .....	Foreign deciduous tree.
150.....	Flowering apple.....	Pyrus coronaria .....	Native deciduous tree.
151.....	English elm .....	Ulmus campestris .....	Foreign deciduous tree.
154.....	Lovely weigela.....	Weigela amabilis.....	Foreign deciduous shrub.
165.....	Varnish tree.....	Kœlreuteria paniculata	Foreign deciduous tree.
Trees on sidewalk on I street next to park.	Pin oak.....	Quercus palustris.....	Native deciduous tree:
Trees on sidewalk on Thirteenth street next to park.	Norway maple.....	Acer platanoides .....	Do.
Trees on sidewalk on K street next to park.	Silver maple.....	Acer saccharinum.....	Do.



## McPHERSON PARK.

Numbers.	Common name.	Botanical name.	Designation.
1, 17, 51, 58.....	Twigged jessamine.....	Jasminum nudiflorum ..	Foreign deciduous shrub.
2, 8, 22, 23, 31, 32, 33, 34, 35, 40, 42, 69, 74, 76, 78, 81, 89, 90, 92, 98, 99, 101, 103, 104, 105, 107.	Silver maple.....	Acer saccharinum.....	Native deciduous tree.
3, 16, 86.....	Variegated Spirea .....	Spirea opulifolia aurea ..	Foreign deciduous shrub.
4, 82.....	Japan snow ball shrub.....	Viburnum plicatum.....	Do.
5, 13, 63.....	Winged euonymus .....	Euonymus alata.....	Do.
6, 12.....	English yew.....	Taxus baccata.....	Foreign evergreen tree.
7, 10.....	Japan maple .....	Acer polymorphum.....	Foreign deciduous tree.
9, 36, 37, 38, 39, 109, 110, 111, 112.	Thunberg's Spirea .....	Spirea thunbergii .....	Foreign deciduous shrub.
11, 45, 67.....	Purple-flowered magnolia..	Magnolia obovata.....	Do.
11, 45, 67.....	Althea.....	Hibiscus syriacus.....	Do.
15, 49, 50, 52, 55, 59.....	American elm.....	Ulmus americana .....	Native deciduous tree.
19, 20, 21, 46, 47, 48, 65, 66.	Deutzia shrub .....	Deutzia .....	Foreign deciduous shrub.
24, 25, 77, 79, 100, 102.	Pearl bush.....	Exochordia grandiflora	Do.
26.....	Varnish tree.....	Koelreuteria paniculata	Foreign deciduous tree.
27.....	Purple-leaved plum.....	Prunus pissardii.....	Do.
28, 43.....	Mimosa tree.....	Albizzia julibrissin.....	Do.
29, 41.....	Red oak .....	Quercus rubra.....	Native deciduous tree.
44.....	Fern-leaved beech .....	Fagus heterophylla .....	Foreign deciduous tree.
53.....	Crape myrtle.....	Lagerstroemia indica.....	Foreign deciduous shrub.
54.....	Purple hazel.....	Corylus purpurea .....	Do.
56, 57.....	Wayfaring tree.....	Viburnum lantana.....	Do.
60, 61, 62, 83, 84.....	Japan maple .....	Acer polymorphum-atropurpureum.	Foreign deciduous tree.
64, 88, 97.....	Large flowering magnolia..	Magnolia grandiflora...	Native evergreen tree.
68, 87.....	Spanish bayonet .....	Yucca aloifolia.....	Native evergreen shrub.
70.....	Japan quince.....	Cydonia japonica .....	Foreign deciduous shrub.
71.....	Cranberry bush .....	Viburnum opulus .....	Native deciduous shrub.
72.....	Red-flowering dogwood....	Cornus florida rubra....	Do.
73.....	English field maple .....	Acer campestre.....	Foreign deciduous tree.
75.....	European hornbeam .....	Carpinus betulus.....	Do.
80, 85, 30.....	American linden.....	Tilia americana .....	Native deciduous tree
91.....	Reeves Spirea.....	Spirea reevesii .....	Foreign deciduous shrub.
93, 94, 95.....	Ginseng bush .....	Aralia quinquefolia .....	Native deciduous shrub.
96.....	Maidenhair tree.....	Ginkgo biloba .....	Foreign deciduous shrub.
106.....	Panicle-flowering Hydrangea.	Hydrangea paniculata grandiflora.	Do.
108.....	White poplar .....	Populus alba .....	Foreign deciduous tree.
Trees on Fifteenth street, east on the sidewalk, 113, 114, 115, 116, 117, 118, 119, 120, 121.	American white elms .....	Ulmus americanus.....	Native deciduous tree.
Trees on K street, north on the sidewalk, 122, 123, 124, 125, 126, 127, 128.	Silver maples.....	Acer saccharinum .....	Do.

## FARRAGUT PARK.

Section 1.			
1, 3, 5, and 6.....	Norway maple .....	Acer platanoides.....	Foreign deciduous tree.
2.....	Red ash .....	Fraxinus pubescens....	Native deciduous tree.
4.....	Horse-chestnut.....	Æsculus hippocastanum.	Foreign deciduous tree.
7.....	Yellow wood .....	Cladrastis lutea .....	Native deciduous tree.
8.....	California privet .....	Ligustrum ovalifolium ..	Foreign deciduous shrub.
9, 10, and 12.....	Golden bell shrub.....	Forsythia viridissima ..	Do.
11.....	Mock orange .....	Philadelphus coronarius.	Do.
Section 2.			
1, 2, 3, and 4.....	Box .....	Buxus sempervirens ...	Foreign evergreen shrub.
5.....	English yew.....	Taxus baccata.....	Foreign evergreen tree.
6.....	English golden yew.....	Taxus baccata aurea...	Do.
Section 3.			
1, 2, 3, and 4.....	Norway maple.....	Acer platanoides.....	Foreign deciduous tree.
5.....	Ginkgo tree .....	Salisburia adiantifolia ..	Do.
6.....	White ash .....	Fraxinus americana .....	Native deciduous tree.
7.....	Sugar maple.....	Acer saccharum.....	Do.

## FARRAGUT PARK—Continued.

Numbers.	Common name.	Botanical name.	Designation.
<b>Section 3—Cont'd.</b>			
8.....	White ash .....	<i>Fraxinus americana</i> ...	Native deciduous shrub.
9.....	California privet .....	<i>Ligustrum ovalifolium</i>	Foreign deciduous shrub.
10.....	Mock orange .....	<i>Philadelphus corona-</i> <i>rius.</i>	Do.
<b>Section 4.</b>			
1.....	Red maple .....	<i>Acer rubrum</i> .....	Native deciduous tree.
2 and 4 .....	White ash .....	<i>Fraxinus americana</i> ...	Do.
3.....	Red maple .....	<i>Acer rubrum</i> .....	Do.
5.....	California privet .....	<i>Ligustrum ovalifolium</i>	Foreign deciduous shrub.
6.....	Rough-leaved <i>Deutzia</i> .....	<i>Deutzia scabra</i> .....	Do.
7.....	Golden bell shrub .....	<i>Forsythia viridissima</i> ..	Do.
<b>Section 5.</b>			
1.....	American elm .....	<i>Ulmus americana</i> .....	Native deciduous tree.
2.....	Horse chestnut .....	<i>Æsculus hippocastanum</i>	Foreign deciduous tree.
3, 4, 5, 6, 7, and 8 .....	Box .....	<i>Buxus sempervirens</i> ...	Foreign evergreen shrub.
9.....	English golden yew .....	<i>Taxus baccata aurea</i> ...	Foreign evergreen tree.
10.....	English yew .....	<i>Taxus baccata</i> .....	Do.
<b>Section 6.</b>			
1.....	Buckeye horse chestnut .....	<i>Æsculus flava</i> .....	Native deciduous tree.
2 and 5 .....	American linden .....	<i>Tilia americana</i> .....	Do.
3.....	Sycamore maple .....	<i>Acer pseudo-platanus</i> ..	Foreign deciduous tree.
4.....	Ash-leaved maple .....	<i>Negundo aceroides</i> .....	Native deciduous tree.
6.....	Norway maple .....	<i>Acer platanoides</i> .....	Foreign deciduous tree.
7.....	English field maple .....	<i>Acer campestria</i> .....	Do.
8 and 19 .....	California privet .....	<i>Ligustrum ovalifolium</i>	Foreign deciduous shrub.
9.....	Austrian pine .....	<i>Pinus austriacus</i> .....	Foreign evergreen tree.
10, 11, and 17 .....	Mock orange .....	<i>Philadelphus coronarius</i>	Foreign deciduous shrub.
12, 13, and 15 .....	Golden bell shrub .....	<i>Forsythia viridissima</i> ..	Do.
14.....	Rough-leaved <i>Deutzia</i> .....	<i>Deutzia scabra</i> .....	Do.
16.....	Variegated <i>Weigela</i> .....	<i>Weigela rosea variegata</i>	Do.
18.....	Japanese pagoda tree .....	<i>Sophora japonica</i> .....	Foreign deciduous tree.
<b>Section 7.</b>			
1.....	Horse chestnut .....	<i>Æsculus hippocastanum</i>	Foreign deciduous tree.
2.....	Ash-leaved maple .....	<i>Negundo aceroides</i> .....	Native deciduous tree.
3.....	Mock orange .....	<i>Philadelphus coronarius</i>	Foreign deciduous shrub.
4 and 7 .....	American elm .....	<i>Ulmus americana</i> .....	Native deciduous tree.
5.....	Japan pagoda tree .....	<i>Sophora japonica</i> .....	Foreign deciduous tree.
6, 8, and 10 .....	European linden .....	<i>Tilia europea</i> .....	Do.
9.....	Norway maple .....	<i>Acer platanoides</i> .....	Do.

## DUPONT CIRCLE.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 30, 59.	American elm .....	<i>Ulmus americana</i> .....	Native deciduous tree.
31.....	Group of rough-leaved <i>Deutzia</i> .	<i>Deutzia scabra vera</i> ....	Foreign deciduous shrub.
32, 33, 54, 134.....	Purple hazel .....	<i>Corylus purpurea</i> .....	Do.
34, 35, 104, 105.....	Double-flowering cherry...	<i>Cerasus flore-plena</i> .....	Foreign deciduous tree.
36, 37, 141, 142.....	Wing-stemmed spindle tree.	<i>Euonymus alata</i> .....	Do.
38, 121.....	Group of Spanish bayonet..	<i>Yucca aloifolia</i> .....	Native evergreen shrub.
39, 52.....	Group of variegated privet.	<i>Ligustrum variegata</i> ...	Foreign deciduous shrub.
40, 107.....	Group of Thunberg's bar- berry.	<i>Berberis thunbergii</i> ....	Do.
41, 42, 43.....	Japanese Judas .....	<i>Cercis japonica</i> .....	Do.
44, 45, 124, 125.....	Sweet-gum tree .....	<i>Liquidambar styraciflua</i>	Native deciduous tree.
46.....	American beech .....	<i>Fagus americana</i> .....	Do.
47, 49.....	Japanese angelica tree .....	<i>Aralia japonica</i> .....	Foreign deciduous tree.
48, 116.....	European silver fir .....	<i>Abies pectinata</i> .....	Foreign evergreen tree.
50, 163.....	Purple beech .....	<i>Fagus sylvatica purpu-</i> <i>rea.</i>	Native deciduous tree.
51, 117.....	Camperdown elm .....	<i>Ulmus scabra pendula</i> ..	Foreign deciduous tree.
53, 60, 139, 158.....	Thunberg's spirea .....	<i>Spirea thunbergii</i> .....	Foreign deciduous shrub.
55, 56, 72, 73, 95, 96, 135, 136, 159, 160.	Purple-flowering magnolia.	<i>Magnolia obovata</i> .....	Foreign deciduous tree.
57, 58.....	Flowering almond .....	<i>Prunus japonica</i> .....	Foreign deciduous shrub.
61, 65.....	Kentucky coffee tree .....	<i>Gymnocladus canadens-</i> <i>is.</i>	Native deciduous tree.
62, 64.....	Ash-leaved maple .....	<i>Acer negundo</i> .....	Do.

## DUPONT CIRCLE—Continued.

Numbers.	Common name	Botanical name.	Designation.
63, 129.....	Paul's flowering hawthorn.	<i>Crataegus Paulii</i> .....	Foreign deciduous shrub.
66, 70, 92, 137.....	Panicle-flowering hydrangea.	<i>Hydrangea paniculata grandiflora</i> .....	Do.
67, 68, 130, 131.....	Indian bean.....	<i>Catalpa bignonioides</i> ..	Native deciduous tree.
69, 126.....	Oriental plane tree.....	<i>Platanus orientalis</i> ....	Do.
71, 87.....	Tartarian bush honeysuckle	<i>Lonicera tartarica</i> .....	Foreign deciduous shrub.
74.....	Weeping dogwood.....	<i>Cornus florida pendula</i> ..	Native deciduous tree.
75.....	Anthony Waterer's pink Spirea.	<i>Spirea Waterii</i> .....	Foreign deciduous shrub
76, 123, 132.....	Golden bell.....	<i>Forsythia viridissima</i> ....	Do.
77, 78.....	Norway maple.....	<i>Acer platanoides</i> .....	Foreign deciduous tree.
79.....	Bald cypress.....	<i>Taxodium distichum</i> ....	Native deciduous tree.
80, 81.....	Hemlock fir.....	<i>Tsuga canadensis</i> .....	Native evergreen tree.
82, 83, 146, 147.....	Silver-leaved linden.....	<i>Tilia europea argentea</i> ..	Foreign deciduous tree.
84, 85, 100, 157.....	Japanese snowball.....	<i>Viburnum plicatum</i> .....	Foreign deciduous shrub.
86, 118.....	Group of Arbor vitae.....	<i>Biota orientalis</i> .....	Foreign evergreen tree.
88, 101.....	Reeves Spirea.....	<i>Spirea Reevesii</i> .....	Foreign deciduous shrub.
89, 90.....	Fern-leaved beech.....	<i>Fagus heterophylla</i> .....	Foreign deciduous tree.
91, 156, 157.....	European linden.....	<i>Tilia europea</i> .....	Do.
93, 133.....	Red-flowering dogwood.....	<i>Cornus florida rubra</i> ....	Native deciduous tree.
94.....	Japanese quince.....	<i>Cydonia japonica</i> .....	Foreign deciduous shrub.
97, 98.....	Sycamore maple.....	<i>Acer pseudo-platanus</i> ..	Foreign deciduous tree.
99.....	Cucumber tree.....	<i>Magnolia acuminata</i> ....	Native deciduous tree.
102, 119, 155.....	Group of Deutzia shrub.....	<i>Deutzia crenata</i> .....	Foreign deciduous shrub.
103.....	Virginian fringe tree.....	<i>Chionanthus virginica</i> ..	Native deciduous tree.
105.....	Saint John's wort.....	<i>Hypericum prolificum</i> ..	Native deciduous shrub.
108.....	Flowering crab apple.....	<i>Pyrus coronaria</i> .....	Native deciduous tree.
109, 110.....	European elm.....	<i>Ulmus montana</i> .....	Foreign deciduous tree.
112.....	Cut-leaved white birch.....	<i>Betula alba laciniata</i> ....	Do.
111, 113.....	Chinese varnish tree.....	<i>Kolreuteria paniculata</i> ..	Do.
114.....	Water oak.....	<i>Quercus laurifolia</i> .....	Native deciduous tree.
115.....	Chestnut oak.....	<i>Quercus prinus</i> .....	Do.
120, 122.....	Purple barberry.....	<i>Berberis purpurea</i> .....	Foreign deciduous shrub.
127, 128.....	Weir's cut-leaved maple.....	<i>Acer saccharinum weirii</i> ..	Native deciduous tree.
133, 154.....	California privet.....	<i>Ligustrum ovalifolium</i> ..	Foreign deciduous shrub.
140.....	English field maple.....	<i>Acer campestre</i> .....	Foreign deciduous tree.
143.....	Chinese weeping cypress.....	<i>Glyptostrobus sinensis</i> ..	Foreign evergreen tree.
144, 145.....	Bhotan pine.....	<i>Pinus excelsa</i> .....	Do.
148, 149.....	Japanese barberry.....	<i>Berberis hakodate</i> .....	Foreign deciduous shrub.
150, 151.....	Cranberry tree.....	<i>Viburnum opulus</i> .....	Native deciduous shrub.
152, 153.....	Japanese golden-leaved cypress.	<i>Retinospora pisifera aurea</i> .....	Foreign evergreen tree.
151, 162.....	European hornbeam.....	<i>Carpinus betulus</i> .....	Foreign deciduous tree.
164, 166.....	Schwedler's purple maple.....	<i>Acer schwedlerii</i> .....	Do.
165.....	Umbrella tree.....	<i>Magnolia tripetala</i> .....	Native deciduous tree.

## IOWA CIRCLE.

1,	17, 18, 0, 41, 5, 56, 5, 76, 6, 87, 102, 121, 135, 147.	Horse-chestnut.....	<i>Æsculus hippocastanum</i> .....	Foreign deciduous tree.
4,		Japan pagoda tree.....	<i>Sophora japonica</i> .....	Do.
6, 116.....		Garland flower.....	<i>Spirea prunifolia</i> .....	Foreign deciduous shrub.
6.....		Stephanandra flexuosa.....		Do.
7, 15, 154.....		Purple barberry.....	<i>Berberis atropurpurea</i> ..	Do.
10.....		Deciduous cypress.....	<i>Taxodium distichum</i> ....	Native deciduous tree.
11, 22, 32, 76, 112, 113, 139, 157.....		Purple lilac.....	<i>Syringa vulgaris</i> .....	Foreign deciduous shrub.
12, 35, 37, 42, 54, 64, 70, 89, 93, 94, 118, 152, 155.....		Golden bell.....	<i>Forsythia viridissima</i> ....	Do.
14, 24.....		Lovely weigela.....	<i>Weigela amabilis</i> .....	Do.
20, 21.....		English field maple.....	<i>Acer campestre</i> .....	Foreign deciduous tree.
23, 60.....		Maldenhair tree.....	<i>Ginkgo biloba</i> .....	Do.
25.....		Large-flowering Hydrangea	<i>Hydrangea paniculata grandiflora</i> .....	Foreign deciduous shrub.
26, 27, 29, 30, 46, 50, 62, 63, 99, 104, 132, 140.....		Japan privet.....	<i>Ligustrum ibota</i> .....	Do.
28.....		Ginseng shrub.....	<i>Aralia quinquefolia</i> .....	Native deciduous shrub.
31, 64.....		Red-twigg'd dogwood.....	<i>Cornus alba</i> .....	Foreign deciduous shrub.
33.....		Berry-bearing alder.....	<i>Rhamnus frangula</i> .....	Do.
35, 65, 106, 143.....		American linden.....	<i>Tilia americana</i> .....	Native deciduous tree.

## IOWA CIRCLE—Continued.

Numbers.	Common name.	Botanical name.	Designation.
38, 67, 69, 71, 144.....	Japan quince.....	<i>Cydonia japonica</i> .....	Foreign deciduous shrub.
44, 52, 91, 96, 141, 153.	Thunberg's barberry.....	<i>Berberis thunbergii</i> .....	Do.
72, 73, 146, 149.....	Norway maple.....	<i>Acer platanoides</i> .....	Foreign deciduous tree.
74, 148.....	Red oak.....	<i>Quercus rubra</i> .....	Native deciduous tree.
77, 90, 92, 117, 128, 133	Rose-flowering weigela.....	<i>Weigela rosea</i> .....	Foreign deciduous shrub.
79.....	Purple hazel.....	<i>Corylus purpurea</i> .....	Do.
80.....	Cranberry bush.....	<i>Viburnum opulus</i> .....	Do.
81.....	Chaste tree.....	<i>Vitex agnus castus</i> .....	Do.
82, 156.....	American arbor vitae.....	<i>Thuja occidentalis</i> .....	Native evergreen tree.
95, 97, 98.....	Hybrid golden bell shrub..	<i>Forsythia intermedia</i> ..	Foreign deciduous shrub.
105, 107.....	Reeves spirea.....	<i>Spirea reevesii</i> .....	Do.
106.....	Variegated Weigela.....	<i>Weigela variegata</i> .....	Do.
110.....	Sycamore maple.....	<i>Acer pseudo-platanus</i> ..	Foreign deciduous tree.
111.....	Nettle tree.....	<i>Celtis occidentalis</i> .....	Native deciduous tree.
115.....	Althea.....	<i>Hibiscus syriacus</i> .....	Foreign deciduous shrub.
119.....	Tartarian honeysuckle.....	<i>Lonicera tartarica</i> .....	Do.
125, 146, 149.....	Norway spruce fir.....	<i>Picea excelsa</i> .....	Foreign evergreen tree.
126, 131.....	Waterer's Spirea.....	<i>Spirea anthony waterer</i>	Foreign deciduous shrub.
129.....	Arrow wood.....	<i>Viburnum dentatum</i> ...	Do.
130.....	Judas tree.....	<i>Cercis canadensis</i> .....	Native deciduous tree.
142.....	Yellow wood.....	<i>Cladrastis lutea</i> .....	Do.
150.....	Box elder.....	<i>Acer negundo</i> .....	Do.

## [Reservation 163, adjoining Iowa Circle.]

1, 2, 3, 4, 5, 6, 7, 14, 15, 16, 17.	Silver maple.....	<i>Acer saccharinum</i> .....	Native deciduous tree.
8.....	Tulip tree.....	<i>Liriodendron tulipifera</i>	Do.
9, 10, 11, 12, 13.....	Norway maple.....	<i>Acer platanoides</i> .....	Foreign deciduous tree.
18.....	Buist's variegated althea...	<i>Althea buistii</i> .....	Native deciduous shrub.
19, 20.....	Weeping golden bell.....	<i>Forsythia suspensa</i> .....	Foreign deciduous shrub.
21.....	Japan Judas shrub.....	<i>Cercis japonica</i> .....	Do.
22.....	Mixed group of shrubs: Golden bell ( <i>Forsythia viridissima</i> ), and rough- leaved <i>Deutzia</i> ( <i>Deutzia scabra</i> ).	.....	Do.
23.....	Pagoda tree.....	<i>Sophora japonica</i> .....	Foreign deciduous tree.
24.....	Red-flowering dogwood....	<i>Cornus florida rubra</i> ....	Native deciduous shrub.
25.....	Mixed group of shrubs: Garland flower ( <i>Spirea prunifolia</i> ); golden bell ( <i>Forsythia viridissima</i> ); purple lilac ( <i>Syringa vul- garis</i> ); Japan quince ( <i>Cy- donia japonica</i> ); mock orange ( <i>Philadelphus coronaria</i> ).	.....	Foreign deciduous shrub.

## [Reservation 154, adjoining Iowa Circle.]

1, 2, 3, 4, 5.....	Silver maple.....	<i>Acer saccharinum</i> .....	Native deciduous tree.
6, 7, 8, 9, 10, 11, 12....	American elm.....	<i>Ulmus americana</i> .....	Do.
13, 14.....	Tulip tree.....	<i>Liriodendron tulipifera</i>	Do.
15, 16, 17.....	Red ash.....	<i>Fraxinus pennsylvani- ca</i> .	Do.
18, 19, 20.....	Ash-leaved maple.....	<i>Negundo aceroides</i> .....	Do.
21, 27.....	Boxwood.....	<i>Buxus sempervirens</i> ....	Foreign evergreen shrub.
22, 28.....	Camperdown elm.....	<i>Ulmus scabra pendula</i> ..	Foreign deciduous tree.
23, 26.....	Mock orange.....	<i>Philadelphus corona- rius</i> .	Foreign deciduous shrub.
24, 25.....	Virginian fringe tree.....	<i>Chionanthus virginica</i> ..	Native deciduous tree.
29.....	Soulangé's hybrid magnolia	<i>Magnolia soulangeana</i> ..	Foreign deciduous tree.
30, 31.....	Hemlock fir.....	<i>Tsuga canadensis</i> .....	Native evergreen tree.
32, 33.....	Nordmann's silver fir.....	<i>Abies nordmanniana</i> ...	Foreign evergreen tree.
34, 35.....	Golden bell.....	<i>Forsythia viridissima</i> ...	Foreign deciduous shrub.
36.....	Group of Reeves spirea.....	<i>Spirea reevesii</i> .....	Do.

## [Reservation 164, adjoining Iowa Circle.]

1.....	Silver maple.....	<i>Acer saccharinum</i> .....	Native deciduous tree.
2, 3.....	Tulip tree.....	<i>Liriodendron tulipifera</i> .	Do.

WASHINGTON CIRCLE.

Numbers.	Common name.	Botanical name.	Designation.
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 29, 30, 31, 62, 65, 88, 104, 120, 137, 138.	Silver maple.....	Acer saccharinum.....	Native deciduous tree.
4, 14, 25, 28, 51 .....	Sycamore maple.....	Acer pseudo-platanus ..	Do.
32, 63, 64, 96 .....	Spanish bayonet.....	Yucca filamentosa.....	Native evergreen shrub.
33, 95, 106, 107.....	Indian currant .....	Symphoricarpus vul- garia.	Native deciduous shrub.
34.....	Lavallees Weigela.....	Weigela lavallee .....	Foreign deciduous shrub.
35.....	Japan Judas.....	Cercis japonica.....	Do.
36.....	Japan Mahonia.....	Mahonia japonica.....	Foreign evergreen shrub.
37, 59, 75.....	English field maple .....	Acer campestria.....	Foreign deciduous tree.
38.....	Pagoda tree .....	Sophora japonica .....	Do.
39, 101.....	Fern-leaved beech.....	Fagus heterophylla .....	Do.
40, 100, 150.....	American elm.....	Ulmus americana .....	Native deciduous tree.
46.....	American beech.....	Fagus americana.....	Do.
41, 54, 56, 70, 72, 76, 77	White poplar.....	Populus alba .....	Do.
43.....	Carolina buck thorn .....	Rhamnus caroliniana..	Do.
44, 79.....	Red ash .....	Fraxinus pennsylvanica	Do.
45, 69, 93.....	Persian lilac.....	Syringa persica.....	Foreign deciduous shrub.
47, 74.....	Purple-leaved plum .....	Prunus pissardii.....	Foreign deciduous tree.
48, 83, 85, 136.....	Rough-leaved Deutzia.....	Deutzia scabra .....	Foreign deciduous shrub.
49, 50, 80, 81.....	Naked jessamine. ....	Jasminum nudiflorum ..	Do.
51.....	Camperdown elm.....	Ulmus scabra pendula..	Foreign deciduous tree.
52.....	Tartarian honeysuckl.....	Lonicera tartarica.....	Foreign deciduous shrub.
53, 78.....	Althea .....	Hibiscus syriacus.....	Do.
55, 58.....	Umbrella catalpa.....	Catalpa umbraculifera ..	Foreign deciduous tree.
57, 84, 141.....	Pearl bush.....	Exechorda grandiflora..	Foreign deciduous shrub.
60, 89.....	Chinese privet.....	Ligustrum sinensis.....	Do.
61.....	False indigo bush .....	Amorpha fruticosa.....	Native deciduous shrub.
66, 68, 86, 91.....	Cornelian cherry.....	Cornus mascula .....	Foreign deciduous tree.
67, 149.....	Purple beech .....	Fagus sylvatica pur- purea.	Do.
71.....	Allspice bush.....	Calycanthus florida ....	Native deciduous shrub.
73.....	Bishop's Cap .....	Halesia tetraptera.....	Native deciduous tree.
82, 116, 117, 148.....	American linden.....	Tilia americana .....	Do.
87.....	Virginia fringe tree.....	Chionanthus virginica ..	Native deciduous shrub.
90.....	Judas tree .....	Cercis canadensis.....	Native deciduous tree.
92.....	European elm .....	Ulmus montana .....	Foreign deciduous tree.
94.....	do .....	Ulmus campestris .....	Do.
97, 99.....	Panicle-flowering Hydran- gea.	Hydrangea paniculata grandiflora.	Foreign deciduous shrub.
98.....	Oak-leaved hydrangea .....	Hydrangea quercifolia ..	Native deciduous shrub.
103, 118, 119, 139.....	Silver-leaved linden.....	Tilia europea argentea ..	Foreign deciduous tree.
102.....	American Arbor vitae.....	Thuja occidentalis.....	Native evergreen tree.
105, 113, 114, 115, 142.	Mock orange .....	Philadelphus corona- rius.	Foreign deciduous shrub.
108, 109, 123, 129.....	Boxwood.....	Buxus sempervirens....	Foreign evergreen shrub.
110, 111, 112, 130, 131, 132, 133, 134, 135.	Slender Deutzia .....	Deutzia gracilis .....	Foreign deciduous shrub.
121.....	English yew.....	Taxus baccata.....	Foreign evergreen tree.
122, 140.....	Horse-chestnut.....	Aesculushippocastanum	Foreign deciduous tree.
123.....	Purple-leaved maple.....	Acer pseudo-platanus variegata purpureum.	Do.
124.....	Japanese maple.....	Acer polymorphum .....	Do.
147, 125, 126, 144, 145, 146.	Norway spruce.....	Picea excelsa.....	Foreign evergreen tree.
127, 143.....	Vine maple.....	Acer circinatum .....	Native deciduous tree.
151.....	Alder tree .....	Alnus acuminata.....	Do.

SHERMAN PLAZA.

1, 2, 12, 13.....	Groups of panicle-flower- ing hydrangea.	Hydrangea paniculata grandiflora.	Foreign deciduous shrub.
3, 4, 9, 10.....	Groups of purple barberry ..	Berberis purpurea.....	Do.
5, 8.....	Hemlock fir .....	Tsuga canadensis .....	Native evergreen tree.
6, 7.....	Groups of Thunberg's bar- berry.	Berberis thunbergii....	Foreign deciduous shrub.
11, 14, 54, 55, 56, 57, 58, 65, 66, 67, 68 69.	White spruce.....	Picea alba.....	Native evergreen tree.
15, 22, 29, 36.....	Variegated Arbor vitae.....	Thuja verticillata .....	Native evergreen shrub.
16, 17, 23, 24, 30, 31, 37, 38.	Variegated Retinospora.....	Retinospora pisifera aurea.	Foreign evergreen tree.
18, 19, 32, 33.....	Red flowering dogwood.....	Cornus florida rubra ...	Native deciduous tree.
20, 21, 34, 35.....	Althea .....	Hibiscus syriacus.....	Foreign deciduous shrub.

## SHERMAN PLAZA—Continued.

Numbers.	Common name.	Botanical name.	Designation.
25, 26, 39, 40.....	Japanese Cercidiphyllum ..	Cercidiphyllum japonicum.	Foreign deciduous tree.
27, 28, 41, 42.....	Purple hazel .....	Corylus purpurea .....	Foreign deciduous shrub.
43.....	Red maple .....	Acer rubrum .....	Native deciduous tree.
70, 71.....	American elm.....	Ulmus americana .....	Do.
44, 61.....	Group of Japanese Judas shrub.	Cercis japonica.....	Foreign deciduous shrub.
45, 62.....	Group of Japanese roses.....	Rosa rugosa .....	Do.
46, 52, 53.....	Group of Thunberg's Spirea.	Spirea thunbergii .....	Do.
47, 48, 49, 51, 51.....	Norway spruce .....	Picea excelsa.....	Foreign evergreen tree.
59, 63.....	Lovely Weigela .....	Weigela amabilis.....	Foreign deciduous shrub.
60.....	Border of honeysuckle .....	Lonicera .....	Do.
64.....	Sugar maple .....	Acer saccharum.....	Native deciduous tree.

## LINCOLN PARK.

[The trees on the curb lines of the sidewalks of A street south and A street north of the park, and Eleventh street east of the park, are all silver maples—*Acer saccharinum*, native deciduous tree. The trees inside the park line bordering the park from Eleventh street to Thirteenth street are 1, 2, American linden—*Tilia americana*, native deciduous tree—and all the rest of the line, American elms—*Ulmus americana*, native deciduous tree.]

Numbers.	Common name.	Botanical name.	Designation.
3, 16.....	White birch .....	Betula populifolia.....	Native deciduous tree.
4, 39, 40, 46, 56, 68, 70, 72, 73, 106, 107, 150.	Red maple .....	Acer rubrum .....	Do.
5, 7, 9, 10, 12, 13, 17, 18, 20, 22, 24, 25, 52, 79, 80, 82, 84, 85, 87, 89, 90, 91, 92, 93, 96, 97, 98, 149, 160, 161, 162.	American elm.....	Ulmus americana .....	Do.
6, 14, 29, 47, 57, 62, 65, 112, 113, 116, 124, 140, 146, 148.	Sugar maple.....	Acer saccharum.....	Do.
8, 11, 15, 35, 144, 147, 162, 164.	Norway maple .....	Acer platanoides .....	Do.
19, 21, 23, 78, 81, 83, 86, 88, 94, 118, 142, 145.	American linden.....	Tilia americana .....	Do.
26, 55.....	Imperial tree .....	Paulownia imperialis ..	Foreign deciduous tree.
27, 28, 30, 31, 32, 44, 48, 49, 71, 106, 109, 125, 157, 129, 130, 134, 135, 136.	Scarlet oak .....	Quercus coccinea.....	Native deciduous tree.
33, 45, 46, 50, 66, 110, 111, 121, 127, 128, 131, 132, 133.	Willow oak.....	Quercus phellos .....	Do.
34, 41.....	Scotch elm .....	Ulmus montana.....	Do.
36, 37, 38, 56, 69, 117, 137.	Spanish bayonet .....	Yucca aloifolia.....	Native evergreen shrub.
42, 43.....	White oak .....	Quercus alba .....	Native deciduous tree.
53, 54, 58, 123, 126.....	Buckeye.....	Aesculus glabra.....	Do.
59.....	California privet hedge.....	Ligustrum ovalifolium.	Native deciduous shrub.
60, 61.....	Japan snowball shrub.....	Viburnum plicatum....	Foreign deciduous shrub.
63.....	Lovely Weigela .....	Weigela amabilis.....	Do.
64, 138.....	Large-flowering magnolia..	Magnolia grandiflora...	Native evergreen tree.
67.....	Black ash.....	Fraxinus nigra.....	Native deciduous tree.
74, 115, 120, 156.....	American holly.....	Ilex opaca.....	Native evergreen tree.
75, 76, 77, 99, 102, 114, 139, 141, 159.	Hemlock .....	Tsuga canadensis.....	Do.
100, 101, 102, 158.....	American Arbor vitae .....	Thuja occidentalis .....	Native deciduous tree.
103, 104, 105, 151, 152, 154, 155.	White pine .....	Pinus strobus.....	Native evergreen tree.
122.....	European plane tree.....	Platanus orientalis.....	Foreign deciduous tree.
143.....	English field maple .....	Acer campestre .....	Do.

## STANTON PARK.

Numbers.	Common name.	Botanical name.	Designation.
7, 8, 9, 22, 23, 77, 78, 98, 99, 2, 108, 2, 113, 3, 117, 1, 132, 5, 136, 2, 183, 9, 200, 1.	European linden .....	<i>Tilia europea</i> ....	Foreign deciduous tree.
81, 82, 42, 76, 4, 126, 2, 143, 1, 162, D.	Fern-leaved beech .....	<i>Fagus heterophylla</i> ....	Do.
	Norway maple .....	<i>Acer platanoides</i> ....	Do.
	Box .....	<i>Boxus sempervirens</i> ....	Foreign evergreen shrub.
	Desmodium .....	<i>Lespedeza penduliflor-</i> <i>um</i> .	Do.
29, 30 .....	Althea .....	<i>Hibiscus syriacus</i> ....	Foreign deciduous shrub.
38 .....	Squarrose-leaved cypress .....	<i>Retinospora squarrosa</i> .....	Foreign evergreen tree.
36, 57, 47, 49, 59, 60, 153, 154.	Garland flower .....	<i>Spirea prunifolia</i> .....	Foreign deciduous shrub.
39, 40, 63 .....	Oriental spruce .....	<i>Picea orientalis</i> .....	Foreign evergreen tree.
41, 64, 65, 66 .....	Cephalonian fir .....	<i>Abies cephalonica</i> ....	Do.
43, 45, 78, 75, 146, 147, 175, 176.	California privet .....	<i>Ligustrum ovalifolium</i> .....	Foreign deciduous shrub.
44, 74, 144, 174, 177 ..	Spanish bayonet .....	<i>Yucca aloifolia</i> .....	Native evergreen shrub.
46, 72, 88, 174, 189, 207.	Weiraute-leaved maple .....	<i>Acer saccharinum</i> <i>weirli</i> .	Native deciduous tree.
48, 71 .....	Japanese snowball shrub ..	<i>Viburnum plicatum</i> ....	Foreign deciduous shrub.
50, 51, 53, 54, 56, 57, 67, 68, 156, 158, 157, 159, 159, 166, 167, 170, 171, 172.	Horse-chestnut .....	<i>Esculus hippocastanum</i>	Do.
52, 58, 162, 163. . .	Golden bell .....	<i>Forcythia viridissima</i> ..	Do.
55 .....	Purple lilac .....	<i>Syringa vulgaris</i> ....	Do.
61, 62 .....	Granberry bush .....	<i>Viburnum opules</i> .....	Native deciduous shrub.
69, 70, 168, 169 .....	Reeve's Spirea .....	<i>Spirea reevesii</i> .....	Foreign deciduous shrub.
82, 87 .....	Twiggy jessamine .....	<i>Jasminum nudiflorum</i> ..	Do.
84, 119, 150, 173 .....	English field maple .....	<i>Acer campestre</i> .....	Foreign deciduous tree.
85, 86, 106, 107, 108, 190, 191, 192, 208, 209, 210.	Scarlet oak .....	<i>Quercus coccinea</i> ....	Native deciduous tree.
87 .....	Laurel oak .....	<i>Quercus imbricaria</i> ....	Do.
89, 90, 93, 94 .....	Japanese quince .....	<i>Cydonia japonica</i> .....	Foreign deciduous shrub.
91, 92 .....	Tartarian honeysuckle .....	<i>Lonicera tartarica</i> ....	Do.
95, 96, 193, 194, 196. .	Bulst's althea .....	<i>Hibiscus syriacus bulstii</i>	Do.
104, 139, 206 .....	Japanese pagoda tree .....	<i>Euphoria japonica</i> .....	Foreign deciduous tree.
121, 123 .....	English holly .....	<i>Ilex aquifolium</i> .....	Foreign evergreen tree.
127 .....	Crape myrtle .....	<i>Lagerstræmia indica</i> ..	Foreign deciduous shrub.
145 .....	Japanese barberry .....	<i>Mahonia japonica</i> ....	Do.
160, 161, 164, 166 .....	Deutzia shrub .....	<i>Deutzia</i> .....	Do.
166, 204 .....	Sorbus-leaved Spirea .....	<i>Spirea sorbifolia</i> ....	Do.
187, 188, 206 .....	Judas tree .....	<i>Cercis canadensis</i> .....	Native deciduous tree.
195, 197, 198 .....	Panicle flowering Hydran-	<i>Hydrangea paniculata</i> <i>grandiflora</i> .	Foreign deciduous shrub.

## FOLGER PARK.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10.	Silver maple .....	<i>Acer saccharinum</i> ....	Native deciduous tree.
11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26.	American linden ...	<i>Tilia americana</i> ...	Do.
27, 28, 29, 30, 31, 32, 33, 34, 35.	Plane tree .....	<i>Platanus occidentalis</i> ..	Do.
36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49.	American elm .....	<i>Ulmus americana</i> .....	Do.
50, 53, 54, 79, 79, 79, 79.	Groups of jessamine .....	<i>Jasminum nudiflorum</i> ..	Foreign deciduous shrub.
51, 52, 54, 55, 56, 61, 62, 70, 71, 72, 73, 74, 75, 76, 77, 78.	Sycamore maple .....	<i>Acer pseudo-platanus</i> ..	Foreign deciduous tree.
59, 60, 126, 127 .....	English field maple .....	<i>Acer campestre</i> .....	Do.



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FOLGER PARK—Continued.

Numbers.	Common name.	Botanical name.	Designation.
56, 59, 80, 84, 99, 120, 180.	English holly.....	Ilex aquifolium.....	Foreign evergreen tree.
57, 81.....	Mimosa tree.....	Acacia julibrissim.....	Foreign deciduous tree.
65, 68.....	California privet.....	Ligustrum ovalifolium.	Native deciduous shrub.
66, 67.....	Purple hazel.....	Corylus purpurea.....	Foreign deciduous shrub.
69, 85.....	Nettle tree.....	Celtis occidentalis.....	Native deciduous tree.
82, 83, 91, 92, 97, 101, 104, 106, 111, 112, 115, 118, 119, 122, 128, 129.	Norway maple.....	Acer platanoides.	Foreign deciduous tree.
86.....	Japan Judas shrub.....	Cercis japonica.....	Foreign deciduous shrub.
87, 106.....	Camperdown elm.....	Ulmus scabra pendula..	Foreign deciduous tree.
88, 89, 124, 125.....	Purple-flowering magnolia.	Magnolia obovata.....	Foreign deciduous shrub.
90, 113.....	Oriental spruce.....	Picea orientalis.....	Foreign evergreen tree.
93, 109.....	Purple beech.....	Fagus sylvatica purpurea.	Foreign deciduous tree.
98, 100, 114, 121.....	Varnish tree.....	Koelreuteria paniculata	Do.
102, 116.....	Fern-leaved beech.....	Fagus heterophylla....	Do.
103, 117.....	European hornbeam.....	Carpinus betulus.....	Do.
107, 108.....	Cucumber tree.....	Magnolia acuminata...	Native deciduous tree.
95, 110.....	American white birch.....	Betula populifolia.....	Do.
96, 123.....	Stag's horn sumach.....	Rhus typhina.....	Do.
94.....	Japan pagoda tree.....	Sophora japonica.....	Foreign deciduous tree.

MARION PARK.

1, 17, 76, 89.....	California privet.....	Ligustrum ovalifolium.	Foreign deciduous shrub.
2, 16, 77, 88.....	Sweet gum tree.....	Liquidambar styraciflua.	Native deciduous tree.
3, 15, 58, 64.....	Pearl bush.....	Exochorda grandiflora.	Foreign deciduous shrub.
4, 14, 78, 87.....	English field maple.....	Acer campestre.....	Foreign deciduous tree.
5, 13, 79, 86.....	Deutzia shrub.....	Deutzia.....	Foreign deciduous shrub.
6, 18.....	Nettle tree.....	Celtis occidentalis.....	Native deciduous tree.
7, 9, 11, 80, 82, 84.....	Althea.....	Hibiscus syriacus.....	Foreign deciduous shrub.
8, 10, 12, 81, 83, 85.....	Purple-flowering magnolia.	Magnolia obovata.....	Do.
19, 20, 36, 54.....	Naked jessamine.....	Jasminum nudiflorum..	Do.
21, 38, 51.....	Silver-leaved linden.....	Tilia argentea.....	Foreign deciduous tree.
22, 23, 24.....	Norway maple.....	Acer platanoides.....	Do.
25, 41, 46, 47, 68, 72.....	Fringe tree.....	Chionanthus virginica..	Native deciduous shrub.
26, 27, 45, 57, 65.....	British oak.....	Quercus robur.....	Foreign deciduous tree.
28, 43.....	European hornbeam.....	Carpinus betulus.....	Do.
29, 42.....	Pin oak.....	Quercus palustris.....	Native deciduous tree.
30.....	Japan pagoda tree.....	Sophora japonica.....	Foreign deciduous tree.
31, 59.....	European white birch.....	Betula alba.....	Do.
32, 34, 35, 60, 62, 63, 75	Spanish bayonet.....	Yucca aloifolia.....	Native evergreen shrub.
33.....	Double-flowering peach....	Amygdalus flore plena..	Foreign deciduous tree.
37, 52, 74.....	Judas tree.....	Cercis japonica.....	Foreign deciduous shrub.
89, 49, 50, 70, 71.....	Sycamore maple.....	Acer pseudo-platanus..	Foreign deciduous tree.
40, 48, 69.....	Colchican maple.....	Acer colchicum rubrum	Do.
44.....	Varnish tree.....	Koelreuteria paniculata	Do.
53, 73.....	Yellow wood.....	Cladrastis lutea.....	Native deciduous tree.
55, 67.....	Laurel oak.....	Quercus Imbricaria....	Do.
56, 66.....	Purple beech.....	Fagus sylvatica purpurea.	Foreign deciduous tree.
61.....	Hercules club.....	Aralia spinosa.....	Native deciduous tree.
Trees on sidewalks of E street, north and south.	Locust.....	Robinia pseudacacia...	Do.
Trees on sidewalks of Fourth street and Sixth street.	Silver maple.....	Acer saccharinum.....	Do.



## APPENDIX E E E.

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### NORTHERN AND NORTHWESTERN LAKES—CORRECTING AND ISSUING CHARTS—SURVEYS—WATER LEVELS.

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*REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1905—OFFICERS IN  
CHARGE, MAJ. WALTER L. FISK, CORPS OF ENGINEERS, UNTIL JUNE  
15, 1905; AFTER THAT DATE, MAJ. LANSING H. BEACH, CORPS OF  
ENGINEERS.*

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UNITED STATES ENGINEER OFFICE,  
*Detroit, Mich., July 18, 1905.*

GENERAL: I have the honor to submit herewith annual report on survey of the Northern and Northwestern lakes for the fiscal year ending June 30, 1905.

Very respectfully, your obedient servant,

LANSING H. BEACH,  
*Major, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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### E E E I.

### NORTHERN AND NORTHWESTERN LAKES—CORRECTING AND ISSUING CHARTS—SURVEYS—WATER LEVELS.

As early as 1816 local surveys of the Great Lakes for special purposes were made by engineer officers, but the survey of the Northern and Northwestern Lakes as a connected and systematic whole was commenced in 1841 and prosecuted continuously until 1882, when work was suspended, as the data then in hand seemed sufficient for the requirements of navigation of the period. After the suspension and until 1889 operations were limited to the publication and issue of charts, \$2,000 or \$3,000 being appropriated annually for this work. In 1889 field operations were resumed under an appropriation made therefor, and have been continued under annual appropriations ranging from \$5,000 to \$150,000. In 1898 these operations were extended to include observations and investigations of lake levels with a view to ascertaining the causes of changes in level, determining the hydraulic data needed for formulating the laws of interlake flow, and devising the most feasible method of lake-level maintenance or regulation.

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Operations during the last fiscal year have included work related to the several features above referred to, as follows:

*Charts.*—The following statement shows the number of charts received and disposed of at this office during the fiscal year ending June 30, 1905:

On hand July 1, 1904.....	31,480
Received from Chief of Engineers, United States Army .....	540
Prepared in this office .....	18,318
Returned from office files .....	2
<b>Total.....</b>	<b>50,340</b>
<b>Sold.....</b>	<b>9,780</b>
Issued for official use .....	2,685
Transferred to United States engineer office, Buffalo, N. Y. ....	2,128
Destroyed (out of date).....	688
On hand July 1, 1905.....	35,059
<b>Total.....</b>	<b>50,340</b>

The total number of charts sold by this office during the year was 9,780, the total amount received from these sales being \$1,605.53, which was duly deposited to the credit of the Treasurer of the United States. The total number of charts that have been sold, issued, and transferred through this office to June 30, 1905, is 300,086, including issues to the United States engineer office at Buffalo.

In continuation of the policy of eventually issuing all lake-survey charts in colors, of keeping constantly revised to date all charts after their issue, and of preparing such additional coast and harbor charts as the interests of navigation seem to require, work as outlined below has been performed in this Office during the year. The revisions of charts embraced changes in aids to navigation, modifications due to river and harbor improvements, latest magnetic determinations, additional and corrected sailing courses, and the most prominent topographic and hydrographic changes developed by commercial and industrial enterprise on the shores of the lakes and their tributary and connecting waters. The changes constantly being made in lights and buoys, pier extension and breakwater construction, etc., render necessary a very large amount of hand work, as every chart is corrected for all information received to the day it is sent out of the office.

Copies of the following-named copperplate charts were revised, to be used as a guide by the engraver in correcting the copperplates:

1. Lake Superior No. 2; scale 1:400,000.
2. Isle Royal (Coast chart No. 8), Lake Superior; scale 1:120,000.
3. North end of Green Bay; scale 1:120,000.
4. Coast chart No. 6, Lake Erie; scale 1:80,000.
5. South end of Lake Michigan; scale 1:400,000.
6. Detroit River; scale 1:40,000.
7. Chart No. 3, St. Lawrence River; scale 1:30,000.
8. Eagle River, Michigan; scale 1:10,000.
9. Agate Harbor, Michigan; scale 1:10,000.
10. Copper Harbor, Michigan; scale 1:10,000.
11. Ontonagon Harbor, Michigan; scale 1:16,000.
12. Lake St. Clair; scale 1:50,000.
13. Grand and Little Traverse bays; scale 1:120,000.
14. Coast chart No. 5, Lake Michigan; scale 1:80,000.
15. Coast chart No. 6, Lake Michigan; scale 1:80,000.
16. Coast chart No. 7, Lake Michigan; scale 1:80,000.
17. Coast chart No. 8, Lake Michigan; scale 1:80,000.

18. Coast chart No. 9, Lake Michigan; scale 1:80,000.
19. Chart No. 2, St. Marys River; scale 1:40,000.
20. Duluth-Superior Harbor, Minnesota and Wisconsin; scale 1:18,000.
21. Beaver Island group, Lake Michigan; scale 1:120,000.

Revisions of copies of the following copperplate charts are in hand:

1. South end of Green Bay; scale 1:120,000.
2. General chart of Lake Michigan; scale 1:500,000.
3. North end of Lake Michigan; scale 1:400,000.
4. Coast chart No. 4, Lake Michigan; scale 1:80,000.
5. Saginaw Bay, Lake Huron; scale 1:120,000.

Copperplates were revised and corrected, transferred to stone, and the charts printed in colors, as follows:

1. General chart of Lake Erie; scale 1:400,000. The third edition in colors. Issued July 9, 1904.
2. Chart No. 5, St. Lawrence River; scale 1:30,000. The second edition in colors. Issued July 26, 1904.
3. Detroit River, scale 1:40,000; with lithograph inset "Lower Detroit River, scale 1:10,000." Includes results of resurveys made in 1903 and 1904. The fifth edition in colors. Issued August 13, 1904.
4. Coast chart No. 1, Lake Ontario; scale 1:80,000. The previously incomplete portion of Bay of Quinte added. The second edition in colors. Issued September 5, 1904.
5. Chart No. 4, St. Lawrence River; scale 1:30,000. The first edition in colors. Issued September 8, 1904.
6. General chart of Lake Superior; scale 1:500,000. Reproduced from drawing (scale 1:400,000) by heliogravure on copperplates. The east coast from Coppermine Point to Cape Gargantua and the northwest coast from Big Trout Bay to Thunder Cape, including southerly portion of Thunder Bay, were reduced from Canadian surveys of 1902 and 1903 and engraved on stone. A new inset of Grand Marais, Mich., surveyed in 1902 and 1903, engraved on stone to scale 1:16,000, was added. The engravings were embodied by transfer on the printing stone. The fourth edition in colors. Issued October 29, 1904.
7. Coast chart No. 6, Lake Erie; scale 1:80,000. Includes Canadian shore and hydrography east of Pelee Point, from survey made in 1904. The second edition in colors. Issued November 23, 1904.
8. Agate Harbor, Michigan; scale 1:10,000. The first edition in colors. Issued December 8, 1904.
9. Eagle River, Michigan; scale 1:10,000. The first edition in colors. Issued December 9, 1904.
10. Copper Harbor, Michigan; scale 1:10,000. The first edition in colors. Issued January 23, 1905.
11. Ontonagon Harbor, Michigan; scale 1:16,000. The first edition in colors. Issued January 24, 1905.
12. Lake St. Clair; scale 1:50,000. Results of resurveys of St. Clair River and delta, made 1900-1903, showing changes in topography and hydrography, were added. The third edition in colors. Issued April 29, 1905.
13. Duluth-Superior Harbor, Minnesota and Wisconsin; scale 1:18,000. Originally engraved on stone and reproduced on copperplates by new process mentioned further on in this report. Resurvey made in December, 1904, and January, 1905, added. The fourth edition in colors. Issued June 6, 1905.
14. Chart No. 2, St. Marys River; scale 1:40,000. The fourth edition in colors. Issued June 13, 1905.
15. South end of Lake Michigan; scale 1:400,000. The first edition in colors. Issued June 19, 1905.

Revisions of copperplates preparatory to new editions of the following charts are in hand:

1. North end of Green Bay; scale 1:120,000. Includes results of resurvey made in 1903 and 1904, showing many changes in hydrography and topography, new reefs, and many shoals heretofore not fully developed. The first edition in colors will be issued about July 13, 1905.
2. Chart No. 2, St. Lawrence River; scale 1:30,000. Results of resurvey of 1901, developing extensive alterations in hydrography and topography, were added to the copperplate. The plate is ready for transfer, for first edition in colors.



3. Lake Superior No. 2; scale 1:400,000. Results of Canadian survey of 1903 of north-west coast from Big Trout Bay to Port Arthur and Thunder Cape, including southerly portion of Thunder Bay, are being added. For first edition in colors.
4. Isle Royal (Coast chart No. 8), Lake Superior; scale 1:120,000. Canadian survey mentioned in preceding paragraph is being added, and Canadian survey of 1904 of northerly portions of Thunder Bay will be embodied. For first edition in colors.
5. Grand and Little Traverse bays, Lake Michigan; scale 1:120,000. For second edition in colors.
6. Chart No. 3, St. Lawrence river; scale 1:30,000. Results of resurvey of 1901 being added. For first edition in colors.
7. North end of Lake Michigan; scale 1:400,000. Results of resurveys of 1903 to 1905, revised sailing courses, etc., are being added. For first edition in colors.
8. Coast chart No. 9, Lake Michigan; scale 1:80,000. For first edition in colors.
9. Beaver Island Group, Lake Michigan; scale 1:120,000. Results of surveys of 1904 and 1905, showing many uncharted shoals and changed hydrography of charted shoals, are being embodied. For second edition in colors.

The following entirely new charts were completed and issued in colors during the year:

1. Coast chart No. 5, Lake Huron, east coast from Port Elgin to Cape Hurd, including southern portion of Georgian Bay to Parry Island, scale 1:120,000; with insets of Penetanguishene Harbor, scale 1:40,000; Owen Sound Harbor, scale 1:16,000; Southampton Harbor, scale 1:24,000; and Midland Harbor and Lions Head Harbor, both scale 1:10,000. Engraved on stone. Issued July 29, 1904.
2. Frankfort Harbor, Michigan; scale 1:5,000. Reduced from survey made in 1903. Engraved on stone. Issued September 24, 1904.
3. Huron Harbor, Ohio; scale 1:5,000. Reduced from survey made in 1904. Engraved on stone. Issued December 7, 1904.
4. Manistee Harbor, Michigan; scale 1:10,000. Reduced from survey made in 1903. Engraved on stone. Issued December 14, 1904.
5. Portage Lake and Portage River, Michigan; scale 1:30,000; with insets of Portage Entry and River, and Portage Lake, upper entrance and canal, both scale 1:15,000. Compiled and reduced from resurveys of 1903 to 1905. Engraved on stone (replacing old copperplate chart). Issued March 15, 1905.
6. Little Bay de Noc and approaches thereto from Green Bay, scale 1:40,000; with insets of Escanaba and Gladstone harbors, both scale 1:20,000. Reduced from surveys of 1903 and 1904. Engraved on stone. Issued May 8, 1905.
7. Harbors of refuge of Presque Isle, False Presque Isle, and Midland Island, Lake Huron; scale 1:40,000. Compiled and reduced from surveys of 1904. Engraved on stone. Issued June 20, 1905.
8. Tawas Harbor, Michigan; scale 1:16,000. Reduced from survey made in December, 1904. Engraved on stone. Issued June 24, 1905.

The preceding edition of the following new chart, engraved on stone, having been exhausted, a thoroughly revised new edition was issued:

Sturgeon Bay Canal and Harbor of Refuge, scale 1:25,000; with inset of harbor of refuge at entrance to canal, scale 1:5,000. Second edition in colors. Issued July 8, 1904.

In addition to the foregoing, the following new charts are well advanced:

1. Coast chart No. 6, Lake Huron, northwest coast of Georgian Bay from Parry Island to Killarney Harbor, scale 1:120,000; with insets of French River Harbor, Depot Harbor, Alexander and Charles inlets, and Point au Baril Harbor, scale 1:24,000, and of Byng Inlet and approaches thereto, scale 1:60,000. The five insets are entirely completed, and the engraving on stone of the chart is nearly finished.
2. General chart of Lake Erie; scale 1:400,000. A new chart is being compiled, reduced, and engraved on stone to replace the worn-out copperplate. The chart will embrace resurveys made in west end of Lake Erie from 1903 to 1905; soundings are being referred to standard low water, the projection based on United States standard datum, and the chart limits extended to include the portion of Lake Ontario from Olcott, N. Y., to Hamilton, Ontario.

3. Head of Green Bay, including Fox River below Depere, Wis.; scale 1:25,000. Being engraved on stone, based on resurvey made in 1904.
4. Manitowoc Harbor, Wisconsin; scale 1:8,000. Reduction completed from survey made in 1904, and engraving on stone in progress.
5. Sheboygan Harbor, Wisconsin; scale 1:10,000. Survey made in 1904 has been reduced, and engraving on stone is under way.

The following small charts, not considered as forming part of the regular series of lake survey charts, were prepared as insets for insertion in the bulletins and supplements:

1. Holdridge Shoal, Lake Huron (previously uncharted), off south shore of Drummond Island, Michigan, scale 1:40,000; with inset of shoal and Detour Passage, scale 1:400,000. Extracts from St. Marys River chart No. 1 and Lake Huron general chart transferred to stone and printed in colors. Published in Supplement No. 8 to Bulletin No. 14, issued December 19, 1904, and also in Bulletin No. 15, issued May 2, 1905.
2. Magnetic variations, west end of Lake Superior; scale 1:400,000. The second edition printed in black from engraving on stone (first edition in Bulletin No. 14). Published in Bulletin No. 15, issued May 2, 1905.
3. Little Rapids, St. Marys River; scale 1:40,000. Showing available channel and aids to navigation at opening of season, 1905. Extract from St. Marys River chart No. 2 transferred to stone and printed in colors. Published in Bulletin No. 15, issued May 2, 1905.
4. Vicinity of Sailors Encampment, St. Marys River; scale 1:40,000. Showing channel and aids to navigation at opening of season, 1905. Extract from St. Marys River chart No. 2 transferred to stone and printed in colors. Published in Bulletin No. 15, issued May 2, 1905.
5. Head of Green Bay, including Fox River below Depere, Wis.; scale 1:60,000. Showing changes in aids to navigation. Engraved on stone and printed in colors. Published in Bulletin No. 15, issued May 2, 1905.
6. Presque Isle Harbor, including North Bay, Lake Huron; scale 1:40,000. Reduced from survey of May and June, 1904, engraved on stone, and printed in colors. Published in Bulletin No. 15, issued May 2, 1905.
7. Lower Detroit River; scale 1:25,000. Showing available channel and aids to navigation at opening of season, 1905. Reduced by photolithography from revised lithograph inset of Lower Detroit River, scale 1:10,000, and printed in colors. Published in Bulletin No. 15, issued May 2, 1905.
8. Index chart of the Northern and Northwestern Lakes; scale 1:4,500,000. Showing designations and limits of published charts. A photolithograph reduced from tracing (scale 1:1,000,000) specially prepared to show new indexing of charts, and printed in colors. Published in new catalogue of charts in Bulletin No. 15, issued May 2, 1905.

The engravings on stone of the charts listed below were reproduced on copperplates (of uniform size 20 by 24 inches) by a new transfer and etching process originated by Assistant Engineer Edward Molitor. With some slight retouching by hand, and recutting and roughing the heavy lines and large lettering to retain the ink, exact reproductions of the original engravings are obtained. These copperplates can be revised and transferred to stone for printing in the usual way whenever a new edition is desired. This method of chart construction combines the advantages of stone engraving, which is faster and less expensive than copper engraving, with the desirable features of copperplates, which are better adapted than stone to making the corrections required in revision for a new edition, and are more easily handled and stored. The stones can be repeatedly polished off and used for new work, which is an essential element in economical lithography, avoiding the necessity of preserving the engravings on the costly lithograph stones and the consequent increase in the number of such stones required to accomplish the same amount of work. The charts thus treated to date are:

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1. Oswego Harbor, New York; scale 1:8,000.
2. Duluth-Superior Harbor, Minnesota and Wisconsin; scale 1:18,000. The transfer for the fourth edition in colors was made from these copperplates, as noted above under the head of copperplates revised and transferred to stone for printing in colors, No. 13.
3. Agate and Burlington bays, Minnesota; scale 1:6,000.
4. Manitou Passage, Lake Michigan; scale 1:30,000.
5. Little Sodus Bay, New York; scale 1:8,000.
6. Maumee Bay and Maumee River, Ohio; scale 1:25,000.
7. St. Joseph Channel and western end of North Channel; scale 1:40,000.
8. Lorain Harbor, Ohio; scale 1:8,000.
9. Coast chart No. 7, Lake Huron; scale 1:120,000.
10. Great Sodus Bay, New York; scale 1:10,000.
11. Frankfort Harbor, Michigan; scale 1:5,000.
12. Marquette and Presque Isle harbors, Michigan; scale 1:15,000.
13. Fairport Harbor, Ohio; scale 1:8,000.
14. Harbor at Michigan City, Ind.; scale 1:5,000.
15. Conneaut Harbor, Ohio; scale 1:5,000.
16. Ashtabula Harbor, Ohio; scale 1:5,000.
17. Muskegon Harbor, Michigan; scale 1:15,000.
18. Manistique Harbor, Michigan; scale 1:5,000.
19. Sturgeon Bay Canal and Harbor of Refuge; scale 1:25,000.
20. Charlotte Harbor, New York; scale 1:5,000.

The methods of work inaugurated four years ago have proven entirely successful and satisfactory and will be continued, with such improvements as experience may suggest.

The reduction, preparation, and reproduction of charts has continued, as heretofore, under the immediate direction and supervision of Assistant Engineer Edward Molitor, and to him is due great credit for the very large amount of satisfactory work turned out during the year.

*Surveys.*—There are six parties at present in the field, as follows:

That under Assistant Engineer F. C. Shenehon is making good progress on the careful reexamination of the west end of Lake Erie, which was commenced two years ago.

Assistant Engineer F. G. Ray's party is continuing its work of the last two seasons, the reexamination of Green Bay and the passages into it from Lake Michigan, and is making its customary excellent record.

The party of Junior Engineer W. J. Graves is continuing its work of the last two seasons in the northeastern portion of Lake Michigan. This party in June reported an important uncharted shoal lying just north of the sailing course between Simmons reef and Lansing shoal.

Junior Engineer A. D. Hollingsworth is engaged upon local harbor surveys for the purpose of extending the lake survey system of charts to include all harbors upon the Great Lakes, many of which are increasing so rapidly in importance that it is difficult to keep pace with their development.

Junior Engineer H. F. Johnson's party is engaged in extending primary triangulation southward along the western shore of Lake Huron.

The sixth and last party, under Junior Engineer M. S. MacDiarmid, is engaged in a resurvey of Les Cheneaux Islands in the north end of Lake Huron.

In addition to the foregoing, Assistant Engineer Thomas Russell has taken a number of sets of magnetic observations covering generally the south shore of Lake Superior and the east and west shores of Lake Michigan.

In the report of Principal Assistant Engineer E. E. Haskell, immediately following, will be found a more complete summary of all matters relating to surveys, they having been under his immediate direction.

There is herewith a chart (Pl. 2) showing the completed triangulation of the Detroit River, adjusted to standard datum. It should be published to perfect the record of adjusted triangulation given in report for 1902.

*Bulletins.*—The bulletins of the survey of Northern and Northwestern Lakes contain important data and information supplementary to the charts, but of too voluminous a character to be incorporated thereon, and they are accordingly issued free in connection with the charts. Bulletin 12, of 1902, and those preceding it, were printed in Washington, but on July 10, 1902, the entire work of printing and issuing bulletins and supplements thereto was turned over to this Office. The work of printing is now performed under contract.

The numbers published during the year are as follows:

Supplement No. 3 to Bulletin 14, July 15, 1904.  
 Supplement No. 4 to Bulletin 14, August 20, 1904.  
 Supplement No. 5 to Bulletin 14, September 23, 1904.  
 Supplement No. 6 to Bulletin 14, October 19, 1904.  
 Supplement No. 7 to Bulletin 14, November 19, 1904.  
 Supplement No. 8 to Bulletin 14, December 19, 1904.  
 Bulletin No. 15, April 15, 1905.  
 Supplement No. 1, to Bulletin 15, May 22, 1905.  
 Supplement No. 2, to Bulletin 15, June 22, 1905.

Supplements Nos. 3, 4, 5, 6, 7, and 8 to Bulletin 14 covered all reported changes of interest to navigators arising between July 1 and December 31, 1904. In pursuance of the policy previously inaugurated of inserting in the bulletins and supplements, as occasion arises, small maps showing locations of new shoals, changes in important channels, harbors not otherwise charted, etc., Supplement No. 8 contained an inset chart of Holdridge shoal, a newly discovered obstruction in Lake Huron off the south shore of Drummond Island, Michigan.

Bulletin No. 15, thoroughly revised and giving the latest information obtainable as to channels, harbors, and matters of navigable interest over the entire Lakes and connecting waters, was mailed out early in May, 1905. The bulletin was 372 pages in size, and in addition to its extensive descriptive matter, contained inset maps of magnetic variations in west end of Lake Superior; Little Rapids, St. Marys River, showing available channel and aids to navigation at opening of season, 1905; vicinity of Sailors Encampment, St. Marys River, showing channel and aids to navigation at opening of season, 1905; head of Green Bay, including Fox River below Depere, Wis.; Holdridge shoal, Lake Huron (as included in Supplement No. 8, mentioned above); Presque Isle Harbor, including North Bay, Lake Huron; and lower Detroit River, showing channel and aids to navigation at opening of season, 1905. The catalogue of charts, with index chart of Northern and Northwestern Lakes, was revised to date and also included. Supplements Nos. 1 and 2 to this bulletin, issued prior to the close of the fiscal year, covered all changes received to June 22.

The present circulation of these publications numbers over 2,100 copies, an increase of more than 200 over the same time last year, extending to a large proportion of the most important interests engaged in the navigation of the Lakes. In addition to this wide distribution there is an increasing demand for the books, arising not only

from the navigators themselves, but from various outside commercial and industrial concerns and individuals whose interests are related in some measure with lake improvement.

*Water levels.*—The stages of water in Lakes Superior, Michigan, Huron, Erie, and Ontario in the following table are from gauge records at the places named, and are referred to mean tide at New York, adjusted levels of 1903.

*Monthly means of water level for stations named, expressed in feet above mean tide at New York.*

[Adjusted levels of 1903.]

Station.	1904.						1905.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Marquette ....	602.86	602.95	603.08	603.26	603.14	602.74	602.47	602.13	602.04	602.25	602.49	602.67
Milwaukee....	581.36	581.26	581.19	581.06	580.78	580.44	580.27	580.21	580.33	580.71	580.98	581.36
Harbor Beach.	581.55	581.53	581.36	581.26	580.95	580.50	580.38	580.30	580.29	580.66	580.95	581.40
Cleveland ....	573.41	573.10	572.84	572.49	572.12	571.77	571.52	571.31	571.18	571.83	572.46	572.98
Charlotte .....	247.78	247.56	247.17	246.84	246.33	245.75	245.60	245.28	245.06	245.80	246.10	246.43

The elevations of “high water of 1838” for each lake, so often referred to, are as follows (levels of 1903):

	Feet.
Lake Superior.....	605.32
Lake Michigan.....	584.69
Lake Huron .....	584.69
Lake Erie.....	575.11
Lake Ontario.....	248.98

There is also herewith a sheet showing the monthly mean water levels of all the Great Lakes from January, 1860, to June, 1905, both inclusive. (See Pl. 1.)

*Investigation of lake levels.*—The principal field work of the year was the collection of lake temperatures for the determination of evaporation from the lake surfaces and the winter discharge measurements of the St. Marys River at Sault Ste. Marie. In office work a large amount of rainfall data was collected and tabulated.

The following table gives a summary of discharges, as so far determined, corresponding to the mean elevations of the various lakes for the last forty-five years:

*Table of mean discharges.*

Mean elevation for 45 years (1860-1904) above mean tide at New York City.		Corresponding mean discharge in cubic feet per second.	
Lake.	Stage.	River.	Discharge
Superior.....	602.29	St. Marys.....	77,000
Huron.....	581.35	St. Clair .....	205,400
St. Clair.....	575.76	Detroit .....	209,900
Erie .....	572.62	Niagara .....	a 215,200
Ontario.....	246.18	St. Lawrence .....	255,200

a Includes 1,200 cubic feet passing out through Erie Canal and 1,100 cubic feet through Welland Canal.



For the continuation of the work of investigating lake levels not less than \$10,000 should be provided for next year.

A matter of greater immediate importance to the commercial interests of the Great Lakes is the bringing up to date of the existing Lake Survey charts, their issue in colors, and the extension of the series to completion on a comprehensive plan.

The original charts were prepared with reference to a navigation calling for a draft of only 12 feet. The soundings were referred to planes representing mean or average stages of water, and general depths exceeding 18 feet below such planes were not closely developed; but present conditions of commerce demand that the bottom be now accurately charted to depths of not less than 30 feet in the open lakes and 25 feet in their connecting rivers or straits, and these depths should relate to "low-water" stages instead of to the "mean stages" referred to above. This calls for extensive surveys and a vast amount of office work, all of which must be done with great care and accuracy. The work has been inaugurated with a considerable plant and force, and means should be supplied to carry it to completion as rapidly as possible. An expenditure of \$115,000 during the year ending June 30, 1907, will be necessary for such reasonable progress as the circumstances of the case require.

I therefore recommend and, so far as permissible, urge that the appropriation for the year 1907 be made to cover the two amounts above indicated, as follows:

For survey of Northern and Northwestern Lakes, including all necessary expenses for preparing, correcting, extending, printing, and issuing charts and bulletins, and of investigating lake levels with a view to their regulation, to be immediately available and to remain available until expended, one hundred and twenty-five thousand dollars.

*Money statement.*

July 1, 1904, balance unexpended .....	\$108,688.24
March 9, 1905, amount allotted from sundry civil act approved March 3, 1905 .....	95,000.00
	<hr/>
	203,688.24
June 30, 1905, amount withdrawn during fiscal year .....	\$3.79
June 30, 1905, amount expended during fiscal year .....	116,839.08
	<hr/>
	116,842.85
July 1, 1905, balance unexpended .....	176,785.39
July 1, 1905, outstanding liabilities .....	10,578.44
	<hr/>
July 1, 1905, balance available .....	166,178.95
	<hr/>
July 1, 1905, amount covered by uncompleted contracts .....	881.77
	<hr/>
Amount that can be profitably expended in fiscal year ending June 30, 1907, in addition to the balance unexpended July 1, 1905 .....	125,000.00

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*Dates and amounts of appropriations for surveys of Northern and Northwestern Lakes.*

March 3, 1841 .....	\$15,000	March 2, 1868 .....	\$77,500
March 18, 1842 .....	20,000	July 20, 1868 .....	75,000
March 1, 1843 .....	30,000	March 3, 1869 .....	100,000
June 17, 1844 .....	20,000	July 15, 1870 .....	100,000
March 3, 1845 .....	20,000	March 3, 1871 .....	175,000
August 8, 1846 .....	25,000	June 10, 1872 .....	175,000
August 12, 1848 .....	25,000	March 3, 1873 .....	175,000
March 3, 1849 .....	10,000	June 23, 1874 .....	175,000
September 28, 1850 .....	25,000	March 3, 1875 .....	150,000
March 3, 1851 .....	25,000	July 31, 1876 (not including	
August 30, 1852 .....	25,000	\$16,000 applied to survey of	
March 3, 1853 .....	50,000	Mississippi River) .....	84,000
August 5, 1854 .....	50,000	March 3, 1877 (not including	
March 3, 1855 .....	50,000	\$25,000 applied to survey of	
August 30, 1856 .....	50,000	Mississippi River and inclu-	
March 3, 1857 .....	50,000	ding \$9,500 received from	
June 12, 1858 .....	75,000	sale of steamers) .....	94,500
March 3, 1859 .....	75,000	June 20, 1878 (not including	
June 21, 1860 .....	75,000	\$49,500 applied to survey of	
March 2, 1861 .....	75,000	Mississippi River) .....	49,500
July 5, 1862 .....	105,000	March 3, 1879 .....	85,000
February 9, 1863 .....	106,879	June 16, 1880 .....	40,000
July 2, 1864 .....	100,000	March 3, 1881 .....	18,000
February 28, 1865 .....	125,000	August 7, 1882 .....	12,000
June 12, 1866 .....	50,000		
March 2, 1867 .....	77,500	Total .....	2,939,879

*Printing and issue of charts for use of navigators and electrotyping copperplates for chart printing.*

March 3, 1883 .....	\$3,000	March 3, 1893 .....	\$2,000
July 7, 1884 .....	3,000	August 18, 1894 .....	2,000
March 3, 1885 .....	3,000	March 2, 1895 .....	2,000
August 4, 1886 .....	2,000	June 11, 1896 .....	2,000
March 3, 1887 .....	2,000	June 4, 1897 .....	2,000
October 2, 1888 .....	2,000	July 1, 1898 .....	3,000
March 2, 1889 .....	2,000	March 3, 1899 .....	3,000
August 30, 1890 .....	2,000	June 6, 1900 .....	3,000
March 8, 1891 .....	2,000		
August 5, 1892 .....	2,000	Total .....	42,000

*Surveys and additions to and correcting engraved plates.*

March 2, 1889 .....	\$5,000	June 11, 1896 .....	\$25,000
August 30, 1890 .....	10,000	June 4, 1897 .....	25,000
March 3, 1891 .....	10,000	July 1, 1898 .....	25,000
August 5, 1892 .....	5,000	March 3, 1899 .....	25,000
March 3, 1883 .....	25,000		
August 18, 1894 .....	25,000	Total .....	205,000
March 2, 1895 .....	25,000		

*Surveys, including investigations of lake levels, correcting, printing, and issuing charts and bulletins.*

June 6, 1900 .....	\$75,000	April 28, 1904 .....	\$150,000
March 3, 1901 .....	100,000	March 3, 1905 .....	100,000
June 28, 1902 .....	150,000		
March 3, 1903 .....	150,000	Total .....	725,000







REPORT OF MR. E. E. HASKELL, PRINCIPAL ASSISTANT ENGINEER.

OFFICE OF SURVEY OF NORTHERN AND NORTHWESTERN LAKES,  
*Detroit, Mich., July 17, 1905.*

MAJOR: I have the honor to make the following report of progress upon work pertaining to the survey of the Northern and Northwestern Lakes, including the investigation of lake levels, for the fiscal year ended June 30, 1905.

My last annual report, beginning on page 4060 of the Report of the Chief of Engineers for 1904, shows the condition of the work at the close of that fiscal year.

As heretofore, the work will be reported under two headings, surveys for the correction to old and the construction of new charts, and the investigation of lake levels.

#### SURVEYS.

During the year just closed surveys for chart purposes were in progress on the west end of Lake Erie, in Green Bay, in the north end of Lake Michigan, in the north end of Lake Huron, and in the harbors of Manitowoc, Sheboygan, and Green Bay, Wisconsin, and Tawas, Rogers, and Portage Lake, Michigan, and in the Detroit River.

The primary triangulation of the north end and west shore of Lake Huron was continued.

A series of magnetic declinations covering a good part of the south shore of Lake Superior, all of the west shore and that of the east shore south of Frankfort, of Lake Michigan was observed.

The Survey's system of self-registering water gauges, covering the entire lake region, was maintained.

*Survey west end of Lake Erie.*—This survey was inaugurated in June, 1903, and had for its primary object detailed hydrography of all of the main thoroughfares traveled by the large vessels of the lakes. It has been continuously under the immediate direction of Mr. Francis C. Shenehon, assistant engineer, with a party quartered on the Survey's steamer *General Williams*.

During the fiscal year 1904 this party practically completed a stretch of hydrography about 5 miles in width, extending from the mouth of Detroit River to Toledo Harbor light, and from the former place to Colchester Reef light. The work of the past year began where the work of the previous year left off at Colchester reef, and was continued eastward to a point about one-half mile east of the position of the Southeast Shoal light-vessel. This strip of hydrography was about 21 miles long and from 6 to 10 miles wide, covering an area of approximately 136 square miles.

This work covers "Pelee Passage," which has been one of the troublesome localities of Lake Erie for many years. The hydrography taken here was very detailed. No pains were spared. The results have been very gratifying. The Survey now has complete knowledge of the shoals of this locality. Many of these that in the past have been thought to be isolated are now shown to be spots on a large general shoal formation.

An uncharted shoal having 14 feet of water on it, lying midway between Middle Ground reef and Pelee Island, was reported by this party September 1, 1904, and notice of it immediately given to the press.

An area of about 58 square miles lying east of Point Pelee was also sounded. This work consisted of both inshore and offshore hydrography and extends along the shore line for about 10 miles, measuring from the end of the point.

The first work of the season of 1905 was the location of the wrecks of the steamers *J. E. Mills* and *Specular*. The former was sunk May 4, about 4½ miles northwest, true, from the north end of Middle Sister Island, and was raised shortly after being located, May 24.

Considerable uncertainty having arisen in regard to the condition and location of the old wreck of the *Specular*, it was decided to relocate it and determine how great a danger it was. The suspected location was therefore swept and the wreck found. It lies about 3½ miles S. 54° 04' E., true, from Middle Ground light-house. At the stage of water prevailing at the time there was 36 feet around and 19 feet over the wreck.

An area of about 5 square miles north of the Bass Islands was sounded in detail. Five shoals were developed, three of which were new. Two of these were reported to the press on June 17 and one on June 19, 1905.

During the progress of the field work of 1904 self-registering water gauges were maintained at Monroe Piers, at Toledo Harbor light, and at Leamington dock; they were discontinued at the end of the season. These gave accurate data for reducing soundings and for transferring levels about the western basin of the lake.

With the opening of the season of 1905 the self-registering gauge at Toledo Harbor light was reestablished, and it is the intention of the Survey to now maintain it indefinitely.

The self-registering gauge at Windmill Point, foot of Lake St. Clair, was given a thorough overhauling the latter part of May. The water is so shallow and there is so much moving sand at this location that this gauge is maintained only with difficulty.

In addition to the above, Mr. Shenehon's party accomplished considerable topographic work at times when the weather conditions were such as to prohibit open lake hydrography. In this connection may be mentioned a survey of Pelee Island, a survey of the Canadian shore from Kingsville to Point Pelee, and up its eastern shore a distance of about 11 miles, a survey of the harbor of Kingsville, and one of the waters about the Leamington dock.

For the control of all of the above work considerable triangulation was necessary; enough was executed, based upon the old work of the Survey, to locate all of the signals used.

The results of the year's work are reported on four detail hydrographic sheets and four detail topographic sheets.

*Survey of Green Bay.*—The survey of Green Bay was in progress at the end of the last fiscal year, and is still in progress. This work was under the immediate direction of Mr. F. G. Ray, assistant engineer, with a party quartered on the Survey's steamer *Search*.

This party reached Green Bay June 17, 1904, and began the field work of this locality on the shoal water extending south from Peninsula Point. This shoal has a length of about  $12\frac{1}{2}$  miles and an average width within the 10-fathom curve of about  $3\frac{1}{4}$  miles. One new uncharted shoal, *North Drisco*, was discovered. It is a mound of bowlders lying within a circle of 100 feet radius,  $2\frac{1}{2}$  miles south  $30^\circ$  east from the present position of the Eleven-foot Shoal light vessel in latitude  $45^\circ 34' 23''$ , longitude  $86^\circ 58' 10''$ . The minimum depth is 16.9 feet, referred to standard low-water plane of reference.

The survey of Little Bay de Noc, which was undertaken in 1903, was completed. This work consisted of taking the shore-line topography from primary triangulation station Ford River to the mouth of Bark River, and from Peninsula Point to Chipewa Point, a total distance of 21 miles.

On completion of the above a survey of Porte des Morts was started and the triangulation of the passage completed and the shore-line topography nearly so. No hydrography was taken. At this juncture, owing to the lateness of the season—October—work was suspended in this locality and the party took up the survey of the harbor of Green Bay, including the head of the bay south of latitude  $44^\circ 37' 30''$ , for a new chart of the "Head of Green Bay and Fox River below Depere."

This survey included the Fox and East rivers below Depere and the cities of Green Bay, Depere, and West Depere. It consisted of the necessary triangulation for controlling the work, topography, and detailed hydrography. The hydrography of the bay south of a line passing through Long Tail and Sable points was done during the winter by a small party working under the direction of Junior Engineer Ira C. Sunderland, one of Mr. Ray's assistants.

Mr. Ray closed his field work for the season on Green Bay November 25, and proceeded to Tawas Harbor on Lake Huron, where on the 30th he began a survey of this harbor, including that of East Tawas. This survey comprised topography along 9 miles of lake shore and about 3 square miles of detailed hydrography along the harbor front.

Since taking the field the present season this party has completed the hydrography of the south end of Green Bay north to latitude  $44^\circ 37' 30''$ , made a survey of the entrance and harbor of Cedar River, a detailed survey of Whaleback shoal, and resumed work in Porte des Morts.

A summary of the work of this party for the year may be itemized as follows:

Shore-line topography .....	miles..	116 $\frac{1}{2}$
Hydrography .....	square miles..	137
Number of soundings .....		60,000
Number of located soundings .....		17,000

An interesting piece of work accomplished by this party was the triangulation of Porte des Morts by what Mr. Ray has termed "water triangulation." For satisfactory locations in this passage a tertiary system at least was necessary. To start this from the old primary system was to involve an unwarranted expenditure. He therefore conceived the idea of using the foremast of the steamer, on the top of which was a collapsible balloon-rigged signal for sounding locations for a water triangulation

station. Starting then with a known tertiary line of the work of 1903 off the north-east side of Washington Island, the steamer was anchored about 5 miles offshore, so as to form well-conditioned triangles with the two known stations and a third one selected on shore. The steamer was then located by simultaneous pointings to the balloon signal on foremast from the three stations, and angles read to the adjacent stations. Each observation thus made gave a pair of triangles and one determination of the required length of a new line. Twenty sets of observations were made at intervals of four minutes for a complete determination of the new line, the usual methods of observing angles being employed. An independent set of angles was read to transfer the azimuth. Three such transfers were included in the system besides 13 regular triangles.

By this method a tertiary system of triangles was carried from the line indicated above, southward to the passage, then through it, and up the west side of Washington Island to a connection with the old primary station, Boyers Bluff, on northwest point of island. The error in closing on this station by this method was found to be but 0.57 meter, or about 1:105,000, for the distance triangulated. Certainly work of a very high order considering the instability of the water station.

*Survey of the north end of Lake Michigan.*—The survey of the north end of Lake Michigan was in progress at the close of the last fiscal year and was continued throughout nearly the whole of the year that has just closed.

It should be stated that the hydrographic work accomplished to date in this locality has been confined almost wholly to shoals lying in or near the pathway of vessels passing to and from Lake Michigan ports and the Straits of Mackinac.

The work of the last year covered the following shoals: Simmons reef, Boulder reef; Lansing shoal, Richards reef, Garden and Squaw islands shoals, Trout Island shoal, Gull Island reef, shoals east of Beaver Harbor and Hog Island reef, and Fagan reef; and Holdridge shoal, south of Drummond Island, and three new shoals near Tobin reef in the north end of Lake Huron.

"Simmons reef" was sounded in great detail and the depth on a large number of the large boulders lying on top of it found. This is a particularly dangerous reef, as is witnessed by the number of vessels that have grounded on it during the past two seasons. It is rendered more dangerous by its large extent and the fact that it can not be detected in time by soundings to prevent grounding, unless vessel is moving very slowly, for it rises abruptly out of deep water. The rock on which the *Craig* struck lies 1,900 feet northwest by west from the gas buoy, and there is but 6 feet of water over it at standard low water.

"Boulder reef" is a large flat sand reef about 6 miles long by 2 miles wide and lying in a north-and-south direction. On the southerly end is a large detached rock about 18 feet across, on which there is 18.5 feet at standard low water, with 40 feet around its sides. This rock is white in color and can be seen 100 feet away when the lake is calm. About 2,000 feet northwest of this rock is a small boulder shoal with 15 feet of water on it at standard low water, that is marked by a red-and-black striped spar buoy. The location of this shoal was found to be about five-eighths of a mile from its position as shown on the Survey charts.

"Lansing Shoal" was carefully sounded and is shown to be made up of three small shoals having 18 feet or less on them at standard low water. The first of these lies about 400 feet north by west from the light vessel, and its center is marked by a red spar buoy placed directly over a large boulder on which there is 14 feet at standard low water. The second shoal is about 1,700 feet long lying 5,800 feet NNW.  $\frac{1}{4}$  W. from the former, with its major axis on the above course. Least water, 18 feet. The third shoal lies 8,600 feet NW.  $\frac{1}{4}$  W. from the spar buoy and has a minimum depth of 17.5 feet at standard low water.

"Richards reef" is a small shoal and was sounded in detail. It was found to be about three-fourths of a mile from its previously charted position and has a least depth on it of 23 feet at standard low water.

"Garden and Squaw Island shoals" were carefully sounded, the work on them being done during bad weather, when the party could not work in the more exposed localities. Less water than previously noted was found in several places, and the submarine contours of a point making off the northwest corner of Squaw Island were extended somewhat. On this point a small boulder shoal 5,000 feet NW.  $\frac{1}{4}$  W. from Squaw light-house, having a minimum depth of 17.2 feet at standard low water was found.

"Trout Island shoal" and the shoal making off the northwest corner of High Island were carefully developed and the results disclose less water, particularly on the former, which lies near the course of vessels going through the passage north of Beaver Island.

"Gull Island reef" was carefully developed and found to extend fully a mile farther to the southward than shown on the survey charts. It is a large boulder shoal and on account of being unmarked is carefully avoided by all vessels having occasion to pass near its location.

"Shoals east of Beaver Harbor and Hog Island reef" were carefully developed during weather that could not be utilized in more exposed localities. The results of this work showed less water than previously reported on the charted shoals and two new ones were found—the first a cluster of small gravel shoals about 3 miles S.E. by E.  $\frac{1}{4}$  E. from Beaver Island Harbor light-house with least depth of 14 feet; the second a small boulder shoal lying about 2 miles southwest by south from the south point of Hog Island. No change was found in Hog Island reef.

The above work was accomplished during the field season of 1904. Mr. Graves's party took the field for the season of 1905 May 9, and on May 16 began work on "Fagan reef," a newly discovered shoal area lying northwest of Simmons reef, between longitudes  $85^{\circ} 16'$  and  $85^{\circ} 56'$  and latitudes  $45^{\circ} 56'$  and  $45^{\circ} 58.25'$ .

This reef is best described in Mr. Graves's own words taken from his monthly report for May: "This area is a clay, sand, and gravel flat about 2 miles wide and 4 miles long, running lengthwise of which, in an east and west direction, are three narrow parallel stony ridges, the center one running practically the entire length of the flat. On this ridge we found seven shoals under 22 feet at standard low water, and five more such shoals on the north and south ridges. Least depth, 15 feet."

A small shoal lying  $2\frac{1}{2}$  miles west by north of Fagan reef, where the charts show 31 feet, was also found. This shoal has a minimum depth of 20 feet at standard low water.

The name "Fagan" has been given to this reef from the fact that it was known to a fisherman by this name living at Naubinway.

It is certainly remarkable that so large a shoal area as this should have gone all this time uncharted. It is also remarkable that some large vessel navigating these waters in thick and foggy weather has not come to grief on some one of the shoal spots discovered.

On November 10, 1904, Mr. George Holdridge, master of the steamer *Briton*, reported to this office a shoal that he grounded on November 13, 1892, with the steamer *A. D. Tomson*, off the south shore of Drummond Island, about 9 miles east of Detour light-house. Mr. Graves was instructed to examine this area, and under date of November 25 reported to this office a dangerous shoal exactly in the position given by Captain Holdridge. This shoal was immediately reported to the press.

After completing the survey of Fagan reef early in June Mr. Graves was instructed to examine the locality of "Tobin" and "Martin" reefs in the north end of Lake Huron. This examination consisted of a careful development of the shoals named, which resulted in the finding of three new shoals in the locality. The most important of these is a narrow east and west boulder reef about 3,000 feet long on the 24-foot contour and lying 5,000 feet southwest of Tobin reef. Least depth, 13.2 feet at standard low water.

The two other new shoals lie northwest by north of Martin Reef gas buoy, one at a distance of 10,500 feet with a minimum depth of 14.9, and the other at a distance of 14,000 feet with a minimum depth of 21.4 feet at standard low water.

The minimum depths found by this survey on Tobin and Martin reefs were 0.9 and 0.4 foot, respectively, for standard low water.

Mr. Graves collected a large number of surface temperatures of Lakes Huron and Michigan, these observations being taken daily wherever the steamer happened to be.

*Harbor surveys.*—A small survey party, quartered on the Survey's steamer *No. 1*, was engaged in harbor and other local surveys during the year. This party was in charge of Mr. Murray Blanchard, junior engineer, from July 1 to the close of the field season of 1904, and under Mr. A. D. Hollingsworth, junior engineer, from the opening of the season of 1905 to date.

At the beginning of the year Mr. Blanchard with his party was en route to Manitowoc, Wis., where he arrived on July 12. Between this date and August 22 a complete survey was made of this harbor and the inshore hydrography of the lake from Manitowoc to Point Creek. This survey embraced the necessary tertiary triangulation, topography, and hydrography. This work is plotted on three detail sheets, the harbor, on a scale of 1:5,000, being on two of them and the inshore hydrography, on a scale of 1:10,000, on the third.

The survey of Sheboygan Harbor, Wisconsin, was begun August 23 and completed October 1. This survey was similar to the one at Manitowoc. The results of it are plotted on two detail sheets on a scale of 1:5,000.



On completion of this work this party proceeded to Les Cheneaux Islands and spent until November 11 sounding the channels between the islands between the Western Entrance and Cedarville. This work was done in great detail and will be spoken of later under other work in the same locality.

The interval from November 28 to December 6 was spent in sounding the Survey's standard cross sections at the head of the St. Clair River and in putting the self-registering water gauges at Port Huron in good condition for winter.

At the opening of the present field season Mr. A. D. Hollingsworth, junior engineer, was detailed to take charge of this party. He took the field the latter part of April, beginning work in the lower Detroit River, completing a survey of the right bank between Trenton and Fort Wayne that was begun during 1904. This party left Detroit May 29 for Portage Lake, on Lake Michigan, where it arrived June 6. Since this date it has been actively engaged in surveying this harbor, and at this date has the work about half finished.

*Triangulation, north end and west shore of Lake Huron.*—The triangulation of the north end and west shore of Lake Huron, in progress at the close of the last fiscal year, was continued throughout the year and is still in progress. This work was under the immediate direction of Mr. H. F. Johnson, junior engineer.

The field work of this party for 1904 started with the angle reading at station Duck Island, Ontario. The angles there were completed and the party had just reached station Reid, on Cockburn Island, at the beginning of the fiscal year. The angle reading at this station was completed July 26, when the party moved to station Bruder, near Rogers, Mich. The angles at this station were completed September 16, when the party moved to Presque Isle, where the angle reading was finished October 16. This completed the cross-lake connection, leaving the system wholly on the Michigan side of the lake. From stations Duck Island and Reid a careful connection involving several secondary triangles was made with the Canadian triangulation system, along the south shore of Cockburn and Manitoulin Islands.

The gas-pipe triangulation stations at stations Detour and Duck Island were taken down and one of them erected at station Walker, which is about  $8\frac{1}{2}$  miles south of Presque Isle.

Mr. Johnson with his party left Detroit for the present field season May 9, and has made good progress to date. He has read the angles at four primary stations and extended the reconnaissance well toward Saginaw Bay, which point it is expected he will reach by the end of the coming season.

The gas-pipe triangulation stations have proved a success in every particular. A 108-foot one can be taken down in two days and erected in six days by a party of not to exceed 7 men, all but one of whom are ordinary laborers.

The new acetylene signal lamps introduced last year and used for the first time this spring for night angle reading have proved very satisfactory. While they are similar to those used by the Coast and Geodetic Survey, the lamps are larger, of the automobile pattern, and burn for a period of six hours without refilling.

Besides the regular triangulation work, Mr. Johnson accomplished some topographic and hydrographic work at times when the party could not be employed otherwise. In this connection may be mentioned a survey of Rogers, Mich., and the sounding of Long Lake near station Walker.

*Triangulation, north end of Lake Michigan, and resurvey of Les Cheneaux Islands.*—The triangulation of the north end of Lake Michigan was in progress at the close of the last fiscal year, and was continued until July 31, when this party was assigned to the resurvey of Les Cheneaux Islands.

This work was under the immediate direction of Mr. M. S. MacDiarmid, junior engineer, who, with his party, arrived at St. James, Beaver Island, June 16, 1904. Between this date and July 31 this party occupied nine stations and closed fifteen triangles. The work is in good condition for extension to the southward, and it is hoped to take it up again the coming year. It was dropped temporarily because of such a heavy demand for a new chart of Les Cheneaux Islands, and because the survey had no suitable boat for the use of the party prosecuting the work.

The survey of Les Cheneaux Islands was begun August 1, and is still in progress. This work consists of triangulation, topography, and hydrography. The triangulation starts from the primary line, Mackinac Island–Goose Island, and covers the channels between the islands. At the end of the year it had reached a point near Cedarville, 10 miles from the western entrance. Thirty-eight stations were located and observed, giving fifty-nine triangles.

This party did the topography also, running in the neighborhood of 125 miles of shore-line.



As previously noted, the hydrography of the locality accomplished during 1904 was done by Mr. Murray Blanchard, junior engineer, with the Survey's steamer *No. 1*, steam power over a considerable of the area covered being desirable on account of saving time.

During the present season Mr. MacDiarmid has been furnished with a combination sail and power boat, and has done the hydrography as well as triangulation and topography.

*Magnetic observations.*—Quite an extensive series of magnetic observations for declination, dip, and intensity were made during the months of August, September, and October, 1904, along the shores of Lakes Superior and Michigan. These observations were made by Mr. Thomas Russell, assistant engineer, who occupied the following stations: Grand Marais, Marquette, Portage Entry, Portage Canal, Isle Royal, Copper Harbor, Tamarack Mine, and Ontonagon, on Lake Superior; and Escanaba, Sturgeon Bay, Manitowoc, Sheboygan, Milwaukee, Waukegan, Michigan City, South Haven, Grand Haven, Ludington, and Frankfort, on Lake Michigan; also a station at Detroit, Mich.

Mr. Russell has made a very complete and valuable report upon his work, which follows.

*Water levels.*—For a record of the stage of water in the lakes and their connecting rivers the survey maintained the usual series of water gauges. No changes were made in the series other than the discontinuing of Roberts Landing, Mich., April 24, 1905, and the adding of one new station, namely, Toledo Harbor light, in Lake Erie, which was installed June 20, 1905.

#### INVESTIGATION OF LAKE LEVELS.

The only field operations in progress during the year under the investigation of lake levels were observations for surface temperatures of the lakes and the winter discharge measurements of the St. Marys River.

Observations for surface temperatures have been in progress for a part of the year at the following stations: On Lake Superior, at Devils Island, Stannard Rock, and Passage Island lights; on Lake Michigan, at Milwaukee breakwater and Grand Haven breakwater lights and at Eleven-foot and Lansing Shoal light vessels; on Lake Huron, at Spectacle Reef and Charity Island lights and at light-vessel *No. 67*; on Lake St. Clair, at Grosse Point light-vessel; on Lake Erie, at Toledo Harbor and Horseshoe Reef lights and Southeast Shoal light-vessel; on Lake Ontario, at Genesee west pierhead and Galoo Island lights. In addition to the observations taken at these stations, the parties on the survey's steamers collected a large number of temperatures, they observing the temperature of the surface water daily wherever they happened to be.

During the winter a series of discharge measurements of the St. Marys River were made at Sault Ste. Marie. This work was under the immediate direction of Mr. Murray Blanchard, junior engineer, assisted by Mr. K. B. Turner, recorder. They left Detroit early in February and returned the latter part of March. In this time the party made 60 discharge measurements and 12 or more measurements of each vertical curve at the 27 regular meter stations. A few curves were measured at the stations in the eddy on the American side and the shore station on the Canadian side.

Mr. Blanchard severed his connection with the survey April 1 to accept a position with the Pennsylvania, New York and Long Island Railroad.

Mr. K. B. Turner, working under my direction, has, since his return to the office, nearly completed the computations of the above measurements, but the limited time at our disposal will not permit arranging the results for publication in this report.

#### OFFICE WORK.

During the year, and particularly during the winter season, when all of the regular field force was available, a large amount of office work was accomplished. This work covered the computations involved in the survey work of the several field parties during the season of 1904, the reduction of the magnetic observations made during the year, the reading of gauge rolls and the collection and reduction of staff gauge readings, the collection and tabulation of rainfall data of the Great Lakes Basin, and the tabulation of lake temperatures. At an early date the survey will be ready to publish a large amount of data collected, that will be found of service in the discussion of lake-level problems.

During the year the Survey constructed its new comparator and storage house at Fort Wayne. Two unsuccessful attempts were made to let this work by contract,

after which it was constructed by day labor, the Survey purchasing the required material. This method proved very satisfactory and the cost did not exceed the original estimate.

There have been connected with the engineering force of the field work of the survey for a part or all of the fiscal year the following-named gentlemen:

Assistant engineers, Francis C. Shenehon, F. G. Ray, and Thomas Russell.

Junior engineers, W. J. Graves, Murray Blanchard, H. F. Johnson, M. S. MacDiarmid, Andrew J. Swift, A. D. Hollingsworth, Harry H. Atwell, Sherman Moore, Wellington Roberts, and Ira C. Sunderland.

Recorders, Nelson J. Bell, F. F. Bontecou, John H. Bower, Fred E. Caldwell, W. J. Fyan, E. C. Hrabak, Fred Lockwood, D. G. MacDonald, Wilson F. Millar, John D. Price, Don M. Rounds, K. B. Turner, W. H. Vandeburgh, Charles L. Walker, M. W. Wheeler, and Arton E. Yokom.

Surveyors, S. M. Boorhem, Harry S. MacDonald, Ernest O. Mann, Wm. J. Murphey, and Charles T. Tittmann.

To all of these gentlemen I wish to express my sincere thanks for careful and efficient service rendered.

During the year the following typographical errors have been discovered in previous reports:

Report of 1902, page 3021, Sheboygan light-house, latitude  $43^{\circ} 41' 01.''28$  should be  $43^{\circ} 45' 50.''34$ ; seconds in meters 39.5 should be 1553.6.

Report of 1904, page 4068, Conneaut, Ohio, latitude  $41^{\circ} 54' 02''$  should be  $41^{\circ} 58' 00''$ ; longitude  $80^{\circ} 48' 18''$  should be  $80^{\circ} 33' 18''$ .

Report of 1904, page 4091, in equation (21) H and h in second and third terms should be H' and h'.

Very respectfully, your obedient servant,

E. E. HASKELL,  
*Principal Assistant Engineer.*

Maj. LANSING H. BEACH,  
*Corps of Engineers, U. S. A.*

#### REPORT OF MR. THOMAS RUSSELL, ASSISTANT ENGINEER.

OFFICE OF SURVEY OF NORTHERN AND NORTHWESTERN LAKES,  
*Detroit, Mich., June 30, 1905.*

MAJOR: I have the honor to submit herewith report on magnetic observations made by me during August, September, and October, 1904, along the shores of Lakes Superior and Michigan. A description is given of the methods followed in observing.

Some interesting results are given herewith of the observations for dip and intensity made at the Tamarack mine in upper peninsula of Michigan at a depth of about a mile underground.

All the results of observations for declination made on the lakes in recent years, or in the vicinity, are brought together in Table III for convenience of reference. Chart No. 1<sup>a</sup> shows these declinations reduced to July, 1905, and represented graphically by lines drawn through points of equal degrees of declination.

Temperatures of the surface water of Lake Superior are given herewith taken while crossing the lake from Portage Canal, Michigan, to the west end of Isle Royal, Michigan, and returning August 20 and 24.

The instruments used in the magnetic observations in 1904 were the Würdemann magnetometer No. 3 and the Barrow dip-circle No. 11.

#### MAGNETIC DECLINATION.

The magnetometer used in observing the declination is the Kew pattern of instrument, in which a collimator magnet is suspended by a silk fiber. The magnet is a hollow steel cylinder with a plane glass in the north end when suspended, on which is a system of graduations, and in the south end a lens to render the marks visible in the telescope of which the object glass is three-fourths of an inch distant.

The two smaller magnets with this instrument were used in the observations. The longer of the two is 3.6 inches in length and 0.3 inch in diameter; the shorter one is 3 inches long and 0.3 inch in diameter.

<sup>a</sup> Chart No. 1 not published.

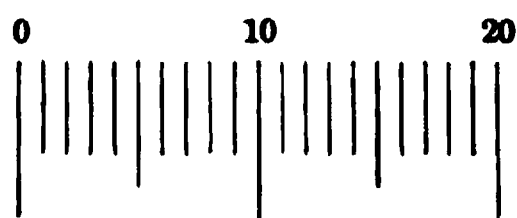
The silk fiber for suspending magnet hangs in a glass tube about 18 inches long. A new fiber, before being used in observing declination, was kept stretched for twelve hours or more by a brass cylinder weight suspended in stirrup for holding magnet. This cylinder is of the same weight and length as the short magnet of small pair of magnets.

The weight is allowed to turn freely, while the instrument is set up in a closed room protected from air currents, to take out all the twist there may be in the fiber before suspending the magnet for declination. Turning the fiber through an angle of 90 degrees changes the direction of the magnet about two minutes of arc. It is estimated that in most instances during the observations of declination the plane of detorsion of suspending fiber was less than one-fourth of a quadrant from the magnetic meridian. The fiber had to be renewed frequently, having broken many times in the course of the observations. It was noted in some instances that after renewing the fiber and after the twist was taken out of it, as near as might be by being left standing overnight, that the period of vibration of the brass weight through an arc of over 90 degrees was about seven minutes.

The long magnet was used at all the stations in observing declination and was always suspended by a single fiber of silk. At Detroit, November 10 and 11, declination was observed with the short magnet also.

The scales on glass on north ends of magnets have the zero, 5, etc., marks longer than the others and projecting on one side. When the magnet is suspended in stirrup with these projections uppermost it is called "erect." When viewed through the telescope, however, the projections are apparently below the main part of marks, as the telescope reverses. For the position of magnet in which the marks are apparently uppermost the magnet is called "inverted." The graduations are considered as numbered from 0 to 20 from the apparent left to right for "erect" position of magnet as shown in sketch.

*Magnet scale erect (apparent).*



The position of axis of magnet is derived from a number of observations made in quick succession with the magnet in "erect" and "inverted" positions at a time of day when the magnetic declination is not changing much—at 1 o'clock in the afternoon, about the time of western elongation.

In setting the magnet in stirrup care is taken to have the marks vertical and parallel to vertical wire of telescope. There are special marks on the scale ends of magnets by which this can be done.

The graduation of the horizontal circle of the instrument is from 0° to 360° in the order of azimuth, from the south through the west and north to the east. The circle, 6 inches in diameter, is read by two opposite verniers; the lowest count of each vernier is 30" and the readings can be estimated to 15". For the "erect" position of magnet increasing scale readings correspond to decreasing circle readings.

For the long magnet the axis is at 13.2 divisions on the scale. The value of one interval on the scale is 2.34' of arc.

For the short magnet the axis is at 12.7 divisions on the scale. The value of one interval on the scale is 2.64' of arc.

In determining declination the magnet scale was observed at intervals of ten minutes for an hour or more about the time of eastern elongation, near 8 a. m., and again for more than an hour at western elongation, about 12.30 p. m. The magnet during observations is usually oscillating slightly. The oscillation was usually kept within an amplitude of four divisions of the scale. A reading of scale is the mean of two successive observations of the scale for the extreme positions of the scale during the oscillation of the magnet across the vertical wire of telescope to the left and right.

The mean of the readings of scale at the times of eastern and western elongation for the day is taken in deriving the declination for the day. The readings of circle corresponding to mean scale readings is reduced to what the reading would be at the axis of magnet. The greatest reading of scale in the morning is taken as the eastern elongation, and the least reading of scale in the afternoon is taken as the western elongation, the instrument remaining undisturbed in the interval and the telescope not moved.

After leveling the instrument, when set up in the morning and before suspending the magnet, the telescope was directed to some distant object, such as a church spire

or peak of light-house, and the circle read. The magnet was then suspended, and the telescope turned until the graduations on scale were in view. The oscillation of magnet was quieted by the manipulation of another magnet, never, however, brought nearer to it than a foot, and when the amplitude of swing was about four divisions, the telescope was moved until the mean reading of scale on vertical wire of telescope when at its greatest to the left and right was near the 16 division mark on the scale. The circle was then read again. At regular intervals of ten minutes the scale was read until the elongation was passed. The instrument was left undisturbed and observations of the scale begun again about the time of western elongation and continued every ten minutes until that elongation was passed. By the time of western elongation the reading of scale had commonly diminished to nine divisions on the scale. After the western elongation the circle of instrument was read again, and after taking down the magnet the telescope was directed to the distant mark and the circle read once more.

The observations of declination were always made with the magnet "erect." The instrument was protected from the wind by a tent.

The difference between eastern and western elongations was commonly seven divisions on the scale or about  $16'$  of arc. In some instances, on account of weather or for other reasons, it was not convenient to observe the declination at time of elongation, and an observation made at another time of the day was reduced to the elongation. Such cases are indicated in the table by parentheses around the times. In a few instances the eastern elongation of one day is combined with the western elongation of another day.

The declination observed at west end of Isle Royal,  $6^{\circ} 07'$  E., being large as compared with other values in the vicinity,  $3^{\circ} 30'$  E. at Victoria Island and  $3^{\circ} 20'$  E. at Thunder Cape in 1903, the declination was observed at two other points close by the place, for which the declination is given in Table I. These points were on Barnums Island opposite, the one about 600 feet northwest and the other the same distance northeast of the place occupied on Washington Island. The declinations at these points were  $1^{\circ}$  less than on Washington Island.

The gradual decrease in magnetic dip and total intensity in going from north to south along the same meridian is some indication of the absence of any considerable disturbing influence of the magnet due to local attraction. This regularity is very well maintained in the results for the places given here. There is a notable exception, however, in the case of Sheboygan, Wis., where the dip is  $18'$  greater than at Manitowoc, Wis., though the latitude at Sheboygan is  $22'$  less. The same irregularity is shown in the horizontal intensity at Sheboygan, the time of one vibration of the magnet at Sheboygan being 10.33 seconds, while at Manitowoc it was 10.20 seconds; if regular, the time at Manitowoc should have been greater.

At Copper Harbor, Michigan, a blueprint copy of survey of light-house reservation by H. A. Ulfers gives a value of the magnetic declination  $3^{\circ} 50'$  E. at that place in October, 1877, probably as observed with a transit needle.

The astronomic azimuth to distant mark, church spire or light-house, for comparison with the magnetic azimuth was determined at every station by observations of Polaris near its eastern elongation. It was usually possible to make this observation about the time of sunset. Pointings were made in the direct and reversed positions of telescope on the distant mark, and the star and corresponding readings of the circle made. The time of observation of Polaris was noted with a watch. The correction of watch on ninetieth meridian time was obtained by comparison with clocks in offices of Western Union Telegraph Company shortly before the time of observation and also after observation. The true or astronomic azimuths to the star were obtained from the star's declination and hour angle with the latitudes of places as given by the Lake Survey charts. The table of "Azimuths of Polaris at any hour angle," given in Coast and Geodetic Survey publication Magnetic Declination Tables and Isogonic Charts, 1902, page 88, was used in deriving the azimuths to the star.

The azimuths to marks at every station were also determined by observations of the sun, using the standard time as obtained at telegraph offices for this purpose. The longitudes to reduce standard to local time were taken from the Lake Survey charts. With the equation of time and sun's declination for the day with the latitude of place and time of observation, the azimuth to sun was obtained by means of the Hydrographic Office azimuth tables. In observing the sun, pointings were made to the western and eastern side of sun and the times and readings of circle corresponding noted. The means gave time and position of center of sun. The observations of sun, using the time obtained at telegraph offices, gave results agreeing very closely for azimuth with those found from Polaris.



## MAGNETIC DIP.

In observing dip the dip circle used, Barrow No. 11, is the Kew pattern of instrument. The needle ends are observed with reading microscopes through the glass side of a compartment in which the needle is inclosed to protect it from air currents. The vertical circle is read by two opposite verniers to single minutes. The needle pivots roll on agate planes. For observing dip the needle is placed in the magnetic meridian by determining the prime vertical to the magnetic meridian from readings of the horizontal circle when the dip needle is exactly vertical. The needle is then put in the meridian by turning the instrument through  $90^\circ$  from the prime vertical by means of the graduated horizontal circle read with one vernier.

In determining the prime vertical or plane perpendicular to the meridian, the vernier of the upper microscope of vertical circle is placed at the zero of graduation of the vertical circle, the instrument having first been accurately leveled. The face of needle, or side on which the number is marked, is south after the needle is put on the supports and lowered on the agate planes. The alidade of instrument is turned, with the circle approximately south, until the south or upper end of needle coincides with the wire in reading microscope. The horizontal circle is then read. The needle is then turned with the face north and the operation repeated, another reading being made with needle in this position. The alidade is then revolved about  $180^\circ$ , making the vertical circle north, and two similar determinations made in this position. The mean of the four readings of horizontal circle gives the position of prime vertical to magnetic meridian.

In observing for dip, readings of both ends of the needle were made and then repeated after raising the needle by the supports and lowering again on the agate planes. Sets of readings were made with the face of the needle east and also west with the circle east. A like series of readings was made with the circle west, the alidade being turned  $180^\circ$  and with the face of needle east and west.

The polarity of the needle was reversed by means of two heavy bar magnets, stroking the needles from the center toward the ends, giving three strokes on each face of the needle. The observations were then all repeated as before with the circle east and west and face of needle alternately east and west. There was usually only a few minutes difference in the results for dip by the two polarities. The difference was not systematic; north polarity for marked end of needle sometimes gave a greater dip than south polarity and sometimes less. The mean for the two polarities was taken for the dip at a place by that needle. Needle No. 3 was used for dip at all the stations; at a few places observations were also made with needle No. 1. Where the two needles were used the mean of results by the two was adopted.

Observations for dip were made at most of the places about 3 o'clock in the afternoon. At Detroit they were made at 11 in the morning, which is about the time when the dip has its greatest value for the day. The diurnal range in dip is about  $2'$  of arc; the limit of accuracy in observing the dip is also about  $2'$ .

## MAGNETIC INTENSITY.

The total magnetic intensity of the earth at a place is obtained by multiplying the observed horizontal component of the force by the secant of the dip at the place. The relative values for the horizontal component of the force at the various places are determined from the observed times of one vibration of the long magnet, the intensities being inversely as the squares of the times of vibration. The horizontal component of the earth's force at Detroit was determined in absolute units or dynes from the observed time of one vibration of the long magnet and the deflection of the short magnet from magnetic meridian, when suspended, produced by the long magnet with the axes of the magnets in the same horizontal plane and perpendicular to each other and the centers 1 foot apart. From the relative values at Detroit and the various other places the absolute values at the other places are derived.

The time of vibration of the long magnet taken in connection with its moment of mass or inertia gives the product of the magnetic moment of the magnet and the horizontal component of the earth's force. The sine of the angle of deflection multiplied by half the cube of distance of magnet centers apart gives the ratio of horizontal component of earth's force to the magnetic moment of magnet. From these two expressions the magnetic moment of the magnet and the horizontal component of the earth's force are both derived.

The moment of mass or inertia of the long magnet is derived from its observed period of vibration when suspended alone and when loaded with a brass ring having its center in the vertical of the suspending fiber of the magnet and the plane of ring perpendicular to suspending fiber. The moment of mass or inertia of the ring

is computed from its measured dimensions and weight. The ring is a right cylinder with a smaller concentric cylinder removed from within. The height of cylinder is two-tenths of an inch. The outside diameter of ring is 2.002 inches, the inside diameter 1.600 inches, and the weight 487.07 grains. The moment of mass or inertia of ring for an axis through the center and perpendicular to the plane of ring is 2.7772, taking the foot as the unit of length and grain as unit of mass. The time of one oscillation of the long magnet at Detroit without ring was 9.885 seconds, and with ring 14.200 seconds, reduced to 60° F. The moment of mass or inertia of long magnet and stirrup from oscillations with and without ring, in units of foot and grain, is 2.6421. A single fiber of unspun silk was used in suspending long magnet with ring in the same manner as when suspending without ring in observations of declination or for times of vibration.

To deflect the suspended short magnet the long magnet was mounted successively with the center 1 foot from short magnet on two wooden bars graduated to tenths and hundredths of a foot, these bars being attached to the alidade of the magnetometer, the two bars projecting on the sides with their ends in contact at center. When the telescope is turned to view the scale of deflected magnet it turns the deflecting magnet through the same angle. The deflecting long magnet was mounted with the axis horizontal and in the same level as the suspended short magnet, and with the centers of magnets exactly 1 foot apart. The angle of deflection was measured by the horizontal circle of instrument, with the north end of deflecting magnet toward and away from the suspended magnet and successively on the east and west side of it, and also with supports of magnet on the wooden bars interchanged. Each magnet has a fine line around it halfway between the north and south ends. The distance between footmarks on the two wooden bars was compared with an accurately known length on a standard bronze bar. In a room at temperature of 70° F. the distance between the two footmarks on wooden bars was found to be 2.0015 feet by the bronze bar. The deflections were observed with the temperature of the air 46° F.

The time of one vibration of the magnet and the angle of deflection observed were reduced to what they would have been at a temperature of 60° F. The coefficient of change of magnetic moment of long magnet is 0.00044 for 1° F., the moment being less as the temperature is higher.

The angle of deflection at Detroit for a distance of 1 foot between magnet centers was 1° 59' 48" reduced to 60° F. The magnetic moment of long magnet at 60° F. is 0.0666 in units of foot and grain. The horizontal component of intensity of earth's force at Detroit in units of foot, grain, and second is 3.8245; in absolute units or dynes on the Coast and Geodetic Survey system, in which the units of length, weight, and time are the centimeter, gram, and second, the horizontal component of the earth's force at Detroit is 0.17634 dyne. The time of one vibration and angle of deflection were observed from 1 to 2 o'clock in the afternoon. The total magnetic intensity is least for the day about 10 o'clock in the morning. The diurnal range in intensity is usually not more than the two-thousandth part of the whole value. This quantity is much less than the accuracy with which the absolute intensity can be determined, the uncertainty in the absolute intensity being as great as the five-hundredth part, on account of the unavoidable errors in the observation of the dip and other elements that enter into the determination.

The time of one vibration of the long magnet was determined at the various stations about the time of western elongation, or from 12.30 to 2 o'clock in the afternoon. The time of one vibration varied from 9.66 seconds at Michigan City, Ind., to 11.76 seconds at west end of Isle Royal, Lake Superior. The time of vibration was determined with an ordinary watch, by the time required to make from forty to one hundred successive vibrations by noting the time of beginning and ending of the series of successive vibrations to the nearest half second, and dividing the interval by the number of vibrations. In some cases a stop watch was used to determine the time interval.

#### TAMARACK MINE OBSERVATIONS.

Observations of dip and horizontal intensity were made at a great depth in the Tamarack copper mine on Keweenaw Point in the northern peninsula of Michigan. Permission to make the observations was given by the superintendent of the mine, Mr. W. E. Parnall. The point occupied was at a depth of 4,760 feet below the surface of the ground at shaft No. 3, in 13 level, about 1,200 feet north of the shaft. The ground at shaft No. 3 is 630 feet above the level of Lake Superior, and the level of lake about 600 feet above sea level. The point occupied was near the end of a

drift through the vein of copper-bearing conglomerate rock which is 20 to 30 feet thick. This part of the mine was not ventilated and the temperature was 95° F.

The tram rails in drift were taken up for a distance of 150 feet on either side of the instrument shortly before observations were begun to be measureably free of local influence. The only iron in vicinity was some spikes in a few ties at 8 to 10 feet from the instrument, which could hardly have influenced the magnet very much. There was no iron in the levels near by, the nearest of which are each about 100 feet above and below the one where the instrument was situated.

There were surveyors' marks in the drift—copper eyelets in plugs imbedded in rock overhead for suspending plumb lines. From plug 10 north to plug 11, a distance of 103.3 feet, the magnetic bearing was 30° 15.7' east of north. There was no astronomic azimuth in the drift carried from surface of ground with which to compare. The declination at point on surface of ground directly over point in mine was 5° 22' E. This declination is somewhat greater than at other places around on the shore of Keweenaw Point, some miles distant. There is a great depth of trap rock above and below the vein where instrument was situated in mine.

The diurnal range of declination in the mine, the difference between the morning eastern and afternoon western elongation, was 14' of arc which is about the same as observed at the surface of the earth in that vicinity. The times of elongation were also about the same as at the surface of the earth. The dip was 27' minutes less in mine than at the corresponding point above it on the surface of the earth. The total magnetic intensity in mine was 0.6227 of a dyne as compared with 0.6070 at the surface of earth just above it, or about a fortieth part greater in the mine than above at the ground. It is interesting to note the decrease in dip and increase in intensity in going down into the earth. As far as known, no results of observations of dip and intensity made in deep mines have before been published.

The descriptions of locations where magnetic observations were made are given below.

#### DESCRIPTION OF MAGNETIC OBSERVATION STATIONS.

*Grand Marais, Mich.*—Station in town of Grand Marais, 150 feet south of south line of Everett avenue and 150 feet east of east line of Katherine street; ground 20 feet above level of Lake Superior.

*Marquette, Mich.*—Station near shore of Lake Superior, 600 feet west of lighthouse ground, 5 feet above the level of lake; near station of 1873.

*Portage entry, Michigan.*—Station near shore of Lake Superior, 500 feet southwest of lighthouse, 50 feet from edge of bluff; ground 20 feet above level of lake.

*Portage Canal, Michigan.*—Station about 400 feet northwest from bend in canal, which is one-fourth mile from Lily Pond, on east side of canal, 203 feet from revetment, and ground 20 feet above the level of water.

*Isle Royal, Michigan.*—Station on north side of Washington Island, one-half mile from eastern end, directly south of center of Barnums Island opposite and 400 feet distant; ground 20 feet above level of Lake Superior.

*Copper Harbor, Michigan.*—Station 100 feet north of old flagstaff at Fort Wilkins, 150 feet from the shore of Lake Fanny Hooe and 800 feet south of shore of Copper Harbor Bay; 90 feet east and 215 feet south of stone pillar, 8 inches square on top, projecting 18 inches above ground, on north side of road east of bridge near lighthouse. The stone has "S" cut on south face and cross lines on top from centers of sides. Same station as in 1873 and near that of 1859; ground about 20 feet above level of Lake Superior.

*Tamarack mine (a), Michigan.*—Station 4,760 feet underground, about 1,200 feet north of shaft No. 3, on 13 level, near the north end of drift, through copper-bearing lode conglomerate rock.

*Tamarack mine (b), Michigan.*—Station on surface of ground, nearly vertically over station (a), height above level of Lake Superior at least 630 feet; distance to Lake Superior, 4 miles northwest. Azimuths: To shaft house No. 3, 5° 42'; to shaft house No. 5, 35° 04'; to water tower, 86° 02'.

*Ontonagon, Mich.*—Station near shore of Lake Superior, 185 feet north of lighthouse; ground 5 feet above level of lake. Same station as 1859.

*Escanaba, Mich.*—Station on shore of Green Bay, 200 feet southeast of Sand Point lighthouse; ground 2 feet above level of water.

*Sturgeon Bay, Wisconsin.*—Station on shore of Lake Michigan, 150 feet from water on point of land about half a mile north of lighthouse at entrance to Sturgeon Bay Canal; ground about 1 foot above level of lake.

*Manitowoc, Wis.*—Station near shore of Lake Michigan, about 3,200 feet north of river at the foot of St. Clair street, 200 feet north of north line of street, 60 feet from edge of bluff, and ground 50 feet above level of lake.



*Sheboygan, Wis.*—Station on shore of Lake Michigan, about half a mile south of river at the foot of Spring street, 50 feet north of north line of street, 80 feet from the water; ground 1 foot above the level of the lake.

*Milwaukee, Wis.*—Station near shore of Lake Michigan, in Juneau Park, 300 feet west of North Point light-house; ground about 50 feet above level of lake, near Coast and Geodetic Survey magnetic station.

*Waukegan, Ill.*—Station on shore of Lake Michigan, three-eighths mile north of pier, 300 feet from water; ground 1 foot above level of lake.

*Michigan City, Ind.*—Station near shore of Lake Michigan, 150 feet north of light-house; ground 5 feet above level of lake, near stations of 1859 and 1873.

*South Haven, Mich.*—Station 200 feet from shore of Lake Michigan, 150 feet north of north bank of Black River; ground 7 feet above level of lake.

*Grand Haven, Mich.*—Station 300 feet from shore of Lake Michigan, 400 feet north of north bank of Grand River; ground 5 feet above level of lake.

*Ludington, Mich.*—Station 150 feet from shore of Lake Michigan and 400 feet north of north pier at entrance to harbor; ground 1 foot above level of lake.

*Frankfort, Mich.*—Station 150 feet from shore of Lake Michigan, 600 feet north of pier at entrance to harbor; ground 4 feet above level of lake.

*Detroit, Mich.*—Coast and Geodetic Survey station on southeast side of Belle Isle Park, 600 feet west of light-house, 75 feet from shore of river and 64.5 feet from edge of road, nearly south of large willow on edge of pond. Station is marked by a stone pillar, the top surface, 8 inches square, flush with the ground, with the letters "U. S. C. & G. S." and an x cut in the top. The ground is about 2 feet above level of river.

Table I gives the magnetic declinations observed in 1904.

Table II gives the results of the observations for dip and horizontal and total intensity of the earth's magnetic force, observed in 1904.

TABLE I.—Magnetic declinations.

Station.	Latitude.	Longitude.	Date.	Declination.	Time of elongation ninetieth meridian.	
					Eastern (a. m.).	Western (p. m.).
Grand Marais, Mich .....	46 41	85 58	1904.	° ' /	h. m.	h. m.
			Aug. 3	0 31.2 W.	8 41	12 41
			Aug. 9	0 41.0 W.	7 31	1 01
			Mean.	0 36.1 W.		
Marquette, Mich.....	46 33	87 23	Aug. 11	1 38.9 E.	8 20	1 00
			Aug. 13	1 34.1 E.	9 24	12 54
			Mean.	1 36.5 E.		
Portage Entry, Mich.....	46 58	88 25	Aug. 16	} 1 41.4 E.	7 34	1 18
Portage Canal, Mich.....	47 14	88 38	Aug. 17			
			Aug. 18			
			Aug. 19			
			Mean.	3 32.0 E.		(12 30)
Isle Royal, Mich .....	47 52	89 14	Aug. 22	6 08.6 E.	7 12	1 42
			Aug. 23	6 10.5 E.	7 44	1 24
			Mean.	6 09.6 E.		
Copper Harbor, Mich .....	47 28	87 52	Sept. 3	} 1 35.2 E.	8 00	2 08
			Sept. 5			
			Sept. 4			
			Mean.	1 31.8 E.	8 10	2 00
Calumet, Mich. (b) Tamarack (sur-	47 16	88 28	Sept. 9	5 22.0 E.	8 30	1 05
face of earth) .....			Sept. 12	3 02.5 E.	8 38	1 18
Ontonagon, Mich .....			Sept. 13	3 02.1 E.	8 27	(1 00)
			Mean.	3 02.3 E.		
Escanaba, Mich.....	45 45	87 03	Sept. 15	0 50.4 W.	(8 30)	1 46
			Sept. 16	0 58.6 W.	8 50	12 50
			Mean.	0 54.5 W.		



TABLE II.—Magnetic dip and intensity.

Station.	Date.	Needle.	Dip.	Horizon- tal inten- sity.	Total in- tensity.
Grand Marais, Mich.....	1904.		°   '	Dyne.	Dyne.
	Aug. 3	No. 1..	76 40	0.1419	0.6146
	Aug. 5	No. 3..	76 38		
	Mean..	.....	76 39		
Marquette, Mich.....	Aug. 11	No. 8..	76 10	.1461	.6111
Portage Entry, Mich.....	Aug. 16	No. 3..	76 33	.1424	.6123
Portage Canal, Mich.....	Aug. 18	No. 3..	77 07	.1379	.6184
Isle Royal, Mich.....	Aug. 22	No. 3..	78 38	.1246	.6322
Copper Harbor, Mich.....	Sept. 3	No. 3..	77 35		
	Sept. 4	No. 1..	77 34	.1322	.6137
	Mean..	.....	77 34		
Tamarack Mine, Mich. (a) (4,760 underground)....	Sept. 7	No. 3..	77 18		
	Sept. 8	No. 3..	77 17	.1371	.6227
	Mean..	.....	77 17		
Tamarack Mine, Mich. (b) (Surface of ground) ....	Sept. 9	No. 8..	77 44	.1290	.6070
Ontonagon, Mich.....	Sept. 12	No. 3..	77 00	.1406	.6251
Escanaba, Mich.....	Sept. 15	No. 3..	75 40	.1528	.6172
Sturgeon Bay, Wis.....	Sept. 19	No. 3..	75 23	.1569	.6218
Manitowoc, Wis.....	Sept. 23	No. 3..	74 20	.1656	.6134
Sheboygan, Wis.....	Sept. 27	No. 3..	74 38	.1615	.6094
Milwaukee, Wis.....	Oct. 1	No. 3..	73 42	.1703	.6067
Waukegan, Ill.....	Oct. 6	No. 3..	72 40	.1780	.5974
Michigan City, Ind.....	Oct. 10	No. 3..	72 22	.1847	.6096
South Haven, Mich.....	Oct. 14	No. 3..	73 11	.1751	.6053
Grand Haven, Mich.....	Oct. 18	No. 3..	73 46	.1710	.6116
Ludington, Mich.....	Oct. 21	No. 3..	74 20	.1673	.6194
Detroit, Mich.....	Nov. 10	No. 3..	73 07		
	Nov. 11	No. 1..	73 12	.1763	.6084
	Mean..	.....	73 09		

MAGNETICS IN LAKE REGION.

With the completion of the magnetic observations made in 1904 the region of the Great Lakes is fairly well covered by observations made in recent years. A connected view of the earth's magnetism over the whole region is now possible, and also of the changes that have taken place in the past thirty years, or since the last magnetic survey was completed, about the year 1873.

In Table III all the magnetic declinations observed in recent years are given, and a few in earlier years, with the dates of observation, and also the computed declination for the middle of year 1905. In reducing to the epoch July, 1905, the annual change used was taken from the chart given in Coast and Geodetic Survey publication "Magnetic Declination Tables and Isogonic Charts, 1902."

In Table III the declinations in "Series 1" are those observed by the Lake Survey with collimator magnet magnetometers, and are accurate to a minute or two of arc. The observation at Isle St. Ignace is an exception, being made with a transit needle. The observations at Isle St. Ignace, 1869-1871, and at Tip Top, 1871, are reduced to 1905 by means of the change shown at Copper Harbor from 1873 to 1904, with 5.5 minutes annually allowed besides, for the years preceding 1873 and for the year 1904 to 1905.

In Table III the declinations in "Series 2" for the west end of Lake Superior are taken from the report of Chief of Engineers, 1904, page 4132, report and charts by J. H. Darling, assistant engineer of the Duluth engineer office. These results in the main are determined on the water with a standard compass, at a height on a steamer. Some results were obtained with a transit needle on shore and on the ice. The report cited describes fully how the observations were made and the method of allowing for the deviations of compass due to the iron on the steamer. The results are of a high degree of accuracy. The values given in Table III are the greatest and least values of declination on some of the lines run.

The west end of Lake Superior shows great local disturbance of the magnetic needle in some places. Near Stony Point, 18 miles from Duluth, a declination of 26° E. was found where the normal for the region is 8° E., a change of 18 degrees in a distance of

650 feet near the shore. Split Rock, 18 miles northeast of Two Harbors, showed declinations varying from 17° E. to 5° W. in a distance of 1,200 feet at a quarter of a mile from shore, while the normal for the locality is 6° E. This irregularity probably disappears a few miles from shore.

In Table III the declinations in "Series 3" are values observed by the Canadian Survey, as given in Coast and Geodetic Survey Tables and in letters to Lake Survey Office.

In Table III the declinations in "Series 4" are taken from the Coast and Geodetic Survey Tables and from letter in Lake Survey Office. These comprise observations on the lakes and some at a distance from the lakes included for the purpose of determining the general direction of the lines of equal declination.

TABLE III.—Recent magnetic declinations in lake region reduced to July, 1905.

## UNITED STATES LAKE SURVEY, SERIES 1.

Station.	Latitude.	Longitude.	Date.	Observed declination.	Annual change.	Computed declination, 1905.5.	Observer.
	° ' "	° ' "		° ' "		° ' "	
Tip Top .....	48 15	86 08	1871.7	0 03.0 E.	.....	2 45 W.	Gen. C. B. Comstock.
St. Ignace .....	48 47	87 49	1869.0	5 08.0 E.	.....	2 54 E.	G. A. Marr.
Do.....			1871.0	6 26.0 E.	.....		Do.
△ Soo .....	46 29	84 21	1895.3	1 51.3 W.	+4.7	2 39 W.	Lieut. C. S. Riché.
Sault Ste. Marie .....	46 30	84 20	1895.3	2 16.5 W.	+4.7	3 04 W.	Do.
Gargantua No. 1.....	47 34	84 58	1895.4	2 52.0 W.	+4.9	3 41 W.	E. E. Haskell.
Gargantua No. 2.....	47 34	84 58	1895.4	1 33.2 W.	+4.9	2 22 W.	Do.
Parisian Island.....	46 40	84 43	1895.6	2 22.5 W.	+4.8	3 10 W.	Do.
North Sandy Island ..	46 50	84 39	1895.7	2 34.4 W.	+4.8	4 21 W.	Do.
Crisp .....	46 44	85 15	1895.5	22.7 W.	+4.9	1 12 W.	Thomas Russell.
Whitefish Point .....	46 46	84 57	1895.8	1 49.5 W.	+4.9	2 37 W.	Do.
Maple .....	46 09	84 47	1896.6	54.3 W.	+4.8	1 37 W.	Do.
Robinson.....	46 04	84 25	1896.7	1 31.0 W.	+4.6	2 11 W.	Do.
Goose Island .....	45 56	84 26	1896.7	1 07.9 W.	+4.5	1 48 W.	Do.
Mackinac Island .....	45 51	84 37	1896.9	1 46.8 W.	+4.7	2 28 W.	E. E. Haskell.
McGulpins Point.....	45 47	84 46	1896.8	54.8 W.	+4.6	1 35 W.	Do.
Salt Point.....	46 28	84 52	1896.5	2 08.5 W.	+4.8	2 51 W.	G. E. Balch.
Point Iroquois.....	46 29	84 38	1896.5	1 34.1 W.	+4.8	2 17 W.	Do.
Round Island .....	46 27	84 31	1896.6	2 04.9 W.	+4.7	2 47 W.	Do.
Neebish Island .....	46 20	84 11	1897.6	3 29.1 W.	+4.5	4 05 W.	Thomas Russell.
Lime Island.....	46 06	84 00	1897.6	3 50.9 W.	+4.6	4 27 W.	Do.
Detour .....	46 00	83 55	1897.7	3 50.8 W.	+4.5	4 26 W.	Do.
Drummond Island ..	45 59	83 53	1897.7	3 48.3 W.	+4.5	4 23 W.	Do.
Mackinac Island .....	45 51	84 37	1897.7	1 48.3 W.	+4.7	2 25 W.	Do.
St. Martins Island...	45 30	86 47	1897.7	39.0 E.	+4.8	02 E.	Do.
Plum Island.....	45 18	86 56	1897.7	1 55.6 E.	+4.8	1 19 E.	Do.
South Manitou Island.	45 02	86 05	1897.7	25.0 E.	+4.7	12 W.	Do.
Glen Haven.....	44 54	86 02	1897.7	1 13.5 W.	+4.7	1 50 W.	Do.
Northport .....	45 08	85 36	1897.7	40.5 W.	+4.6	1 16 W.	Do.
Charlevoix .....	45 19	85 15	1897.7	34.4 W.	+4.6	1 10 W.	Do.
Petoskey .....	45 23	84 56	1897.8	04.1 W.	+4.6	39 W.	Do.
Beaver Island .....	45 44	85 34	1897.7	04.8 E.	+4.8	82 W.	Do.
Waugoshance Point.	45 46	85 00	1897.8	09.2 W.	+4.6	44 W.	Do.
Cheboygan .....	45 38	84 28	1897.8	53.0 W.	+4.6	1 28 W.	Do.
Bols Blanc Island ...	45 44	84 28	1897.8	1 51.0 W.	+4.6	2 26 W.	Do.
St. Ignace .....	45 51	84 42	1897.8	1 36.5 W.	+4.6	2 11 W.	Do.
St. Helena Island....	45 52	84 52	1897.8	35.8 W.	+4.6	1 11 W.	Do.
Manistique.....	45 58	86 13	1897.8	15.2 E.	+4.9	23 W.	Do.
Naubinway .....	46 07	85 38	1897.8	03.4 W.	+4.8	40 W.	Do.
Au Sable .....	44 24	83 19	1901.5	1 24.0 W.	+4.2	1 41 W.	Do.
Sand Beach .....	43 51	82 39	1901.5	2 41.5 W.	+4.0	2 57 W.	Do.
Detroit, Fort Wayne.	42 18	83 06	1901.6	59.1 W.	+3.8	1 14 W.	Do.
Toledo .....	41 42	82 27	1901.7	1 08.1 W.	+3.8	1 22 W.	Do.
Presque Isle.....	46 55	90 37	1901.7	4 34.0 E.	+5.0	4 15 E.	F. G. Ray.
South Twin .....	47 02	90 39	1902.8	4 39.7 E.	+5.0	4 26 E.	Do.
Rocky .....	47 02	90 40	1902.8	4 45.7 E.	+5.0	4 32 E.	Do.
York .....	46 59	90 52	1902.8	4 57.2 E.	+5.0	4 43 E.	Do.
Port Clinton.....	41 31	82 56	1903.7	1 14.8 W.	+3.7	1 21 W.	Thomas Russell.
Lorain .....	41 28	82 11	1903.7	2 15.0 W.	+3.7	2 22 W.	Do.
Fairport.....	41 46	81 16	1903.7	3 44.6 W.	+3.6	3 51 W.	Do.
Conneaut .....	41 58	80 33	1903.7	4 30.7 W.	+3.6	4 37 W.	Do.
Erie .....	42 09	80 05	1903.7	4 24.4 W.	+3.6	4 31 W.	Do.
Buffalo.....	42 54	78 54	1903.7	6 21.2 W.	+3.5	6 27 W.	Do.
Olcott.....	43 20	78 43	1903.7	6 20.1 W.	+3.5	6 26 W.	Do.
Charlotte.....	43 16	77 37	1903.7	6 21.0 W.	+3.3	6 27 W.	Do.
Sodus Point .....	43 16	76 59	1903.7	9 09.9 W.	+3.2	9 16 W.	Do.
Port Ontario.....	43 34	76 12	1903.7	10 08.8 W.	+3.2	10 15 W.	Do.
Fort Gratiot.....	43 00	82 25	1903.8	3 02.1 W.	+3.9	3 09 W.	Do.
Russell Island.....	42 37	82 31	1903.8	3 01.8 W.	+3.8	3 08 W.	Do.
Grand Marais .....	46 41	85 58	1904.6	36.1 W.	+5.1	41 W.	Do.
Marquette.....	46 33	87 23	1904.6	1 36.5 E.	+5.2	1 31 E.	Do.
Portage Entry.....	46 58	88 25	1904.6	1 41.4 E.	+5.2	1 36 E.	Do.

TABLE III.—Recent magnetic declinations in lake region reduced to July, 1905—Cont'd.

UNITED STATES LAKE SURVEY, SERIES 1—Continued.

Station.	Latitude.		Longitude.		Date.	Observed declination.		Annual change.	Computed declination, 1905.5.		Observer.
	°	'	°	'		°	'		°	'	
Portage Canal.....	47	14	88	38	1904.6	3	32.0 E.	+5.2	3	27 E.	Thomas Russell.
Isle Royal.....	47	52	89	14	1904.6	6	09.6 E.	+5.4	6	06 E.	Do.
Copper Harbor.....	47	28	87	52	1904.7	1	31.8 E.	+5.3	1	28 E.	Do.
Calumet.....	47	16	88	28	1904.7	5	22.0 E.	+5.2	5	18 E.	Do.
Ontonagon.....	46	52	89	20	1904.7	3	02.3 E.	+5.1	2	58 E.	Do.
Escanaba.....	45	45	87	03	1904.7		54.5 W.	+4.9		58 W.	Do.
Sturgeon Bay.....	44	48	87	19	1904.7	1	46.4 E.	+4.7	1	42 E.	Do.
Manitowoc.....	44	06	87	40	1904.7	2	44.0 E.	+4.7	2	40 E.	Do.
Sheboygan.....	43	44	87	43	1904.7	2	57.2 E.	+4.6	2	53 E.	Do.
Milwaukee.....	43	04	87	52	1904.8	3	26.4 E.	+4.4	3	23 E.	Do.
Waukeegan.....	42	22	87	49	1904.8	2	39.8 E.	+4.3	2	37 E.	Do.
Michigan City.....	41	43	86	54	1904.8	1	50.2 E.	+4.1	1	47 E.	Do.
South Haven.....	42	24	86	17	1904.8	1	12.7 E.	+4.2	1	10 E.	Do.
Grand Haven.....	43	04	86	15	1904.8	1	10.4 E.	+4.3	1	07 E.	Do.
Ludington.....	43	57	86	28	1904.8	1	37.2 E.	+4.5	1	34 E.	Do.
Frankfort.....	44	38	86	15	1904.8	1	21.8 E.	+4.6	1	18 E.	Do.
Detroit.....	42	20	82	58	1904.9	1	15.5 W.	+3.8	1	18 W.	Do.

UNITED STATES ENGINEER OFFICE, DULUTH, SERIES 2.

Grand Marais, Minn.	47	45	90	21	1887.4	2	11 W.	+5.2	3	45 W.	J. H. Darling.
Do.....	47	45	90	21	1887.4	23	47 E.	+5.2	22	13 E.	Do.
Do.....	47	46	90	20	1887.4	17	59 E.	+5.2	16	25 E.	Do.
North Base, Minnesota Point.	46	45	92	05	1901.1	8	15 E.	+5.0	7	53 E.	Do.
Devils Island.....	47	05	90	44	1902.0	5	54 E.	+5.0	5	39 E.	Do.
Port Wing.....	46	47	91	23	1902.0	6	24 E.	+4.9	6	09 E.	Do.
Minnesota Point.....	46	45	92	03	1902.0	11	54 E.	+4.9	11	39 E.	Do.
Knife Island.....	46	57	91	47	1902.0	9	06 E.	+4.9	8	51 E.	Do.
Two Harbors.....	47	02	91	39	1902.0	6	12 E.	+4.9	5	57 E.	Do.
Duluth Ship Canal..	46	47	92	06	1904.2	8	59 E.	+4.9	8	52 E.	H. H. Wadsworth.
Superior Entry.....	46	43	92	01	1902.2	7	50 E.	+4.9	7	34 E.	Dever.
Split Rock.....	47	11	91	23	1902.0	11	00 E.	+4.9	10	45 E.	J. H. Darling.
Do.....						5	06 W.	+4.9	5	21 W.	Do.
Do.....						7	24 E.	+4.9	7	09 E.	Do.
Lake Superior.....	46	54	91	54	1902.5	15	36 E.	+5.0	15	21 E.	Do.
Do.....	46	51	91	42	1902.5	8	36 E.	+5.0	8	21 E.	Do.
Do.....	46	42	91	50	1902.5	8	30 E.	+5.0	8	15 E.	Do.
Do.....	46	52	92	00	1902.5	8	30 E.	+5.0	8	15 E.	Do.
Do.....	47	30	90	54	1902.5	5	46 E.	+5.0	5	31 E.	Do.
Do.....	47	15	90	54	1902.5	5	00 E.	+5.0	4	45 E.	Do.
Do.....	46	54	91	06	1902.5	7	36 E.	+5.0	7	21 E.	Do.
Do.....	46	48	90	48	1902.5	5	00 E.	+5.0	4	45 E.	Do.
Do.....	46	54	91	45	1902.5	26	24 E.	+5.0	26	09 E.	Do.

CANADIAN SURVEY, SERIES 3.

Foot of Long Portage	47	55	84	45	1880.6	3	14.0 W.	+4.8	5	14 W.	S. W. Very.
Fort Michipicoten...	47	56	84	51	1880.6	1	20.5 W.	+5.1	3	27 W.	
Rondeau Harbor....	42	16	81	52	1896.8	2	07.1 W.	+3.7	2	39 W.	W. J. Stewart.
Long Point.....	42	34	80	08	1896.8	3	55.0 W.	+3.6	4	26 W.	Do.
Turkey Point.....	42	39	80	20	1896.4	3	48.0 W.	+3.6	4	21 W.	J. F. Fraser.
Normandale.....	42	42	80	20	1896.0	2	35.0 W.	+3.6	3	09 W.	Anderson & Stewart.
Port Dover.....	42	47	80	12	1896.3	4	12.0 W.	+3.6	4	45 W.	Do.
Port Maitland.....	42	51	79	35	1896.0	4	59.0 W.	+3.6	5	33 W.	Stewart & Fraser.
Port Colborne.....	42	53	79	16	1896.8	5	23.6 W.	+3.5	5	54 W.	W. J. Stewart.
Toronto Magnetic Observatory.	43	39	79	23	1895.2	4	46.8 W.	+3.6	5	24 W.	O. J. Klotz.
Do.....	43	39	79	03	1903.8	5	36.0 W.	+3.6	5	42 W.	R. F. Stupart.
Goderich.....	43	44	81	43	1901.7	4	11.0 W.	+3.8	4	25 W.	F. Anderson.
Kincardine.....	44	11	81	37	1900.7	4	45.3 W.	+3.9	5	04 W.	Do.
Chantry Island.....	44	30	81	24	1900.8	5	53.3 W.	+3.9	6	11 W.	Do.
Collingwood Harbor.	44	30	80	14	1894.6	4	31.0 W.	+3.8	5	12 W.	Stewart & Campbell.
Nottawasaga River..	44	32	80	01	1893.7	5	42.0 W.	+3.8	6	27 W.	F. Anderson.
Owen Sound.....	44	34	80	56	1897.8	5	26.5 W.	+3.9	5	56 W.	J. F. Fraser.
Whitefish Island....	44	43	81	18	1899.7	5	33.0 W.	+3.9	5	56 W.	F. Anderson.
Cape Rich.....	44	43	80	38	1894.3	4	36.0 W.	+3.8	5	19 W.	Anderson & Stewart.
Valls Point.....	44	44	80	45	1888.6	4	16.0 W.	+3.9	5	22 W.	Captain Boulton.
Victoria Harbor.....	44	45	79	48	1892.7	5	19.0 W.	+3.8	6	08 W.	F. Anderson.
Burke Island.....	44	46	81	18	1899.8	5	42.0 W.	+3.9	6	04 W.	Do.
Christian Island, Indian Village.	44	49	80	10	1894.6	6	08.0 W.	+3.8	6	49 W.	Anderson & Stewart.
Beckwith Island....	44	50	80	06	1893.6	5	55.0 W.	+3.8	6	40 W.	Do.

TABLE III.—Recent magnetic declinations in lake region reduced to July, 1905—Cont'd.

CANADIAN SURVEY, SERIES 3—Continued.

Station.	Latitude.		Longitude.		Date.	Observed declination.		Annual change.	Computed declination, 1905.5.		Observer.
	°	'	°	'		°	'		°	'	
McGregor Harbor ...	44	56	81	02	1888.5	4	55.0 W.	+3.9	6	01 W.	W. J. Stewart.
South Watcher Is....	44	57	80	04	1892.5	6	05.0 W.	+3.8	6	54 W.	D. C. Campbell.
Garden Island.....	45	00	81	23	1899.8	5	54.4 W.	+3.9	6	16 W.	F. Anderson.
Milligan Island .....	45	06	80	07	1891.1	4	52.0 W.	+3.8	6	47 W.	Boulton & Campbell.
Warner Bay .....	45	11	81	38	1899.6	6	25.2 W.	+3.9	6	48 W.	F. Anderson.
Tobermory Harbor..	45	16	81	41	1899.5	6	44.1 W.	+4.0	7	08 W.	W. J. Stewart.
Doctor Island.....	45	16	81	41	1884.6	5	53.0 W.	+4.0	7	17 W.	Captain Boulton.
Reid Island .....	45	19	80	16	1898.3	6	38.0 W.	+3.8	7	05 W.	F. Anderson.
Cove Island .....	45	20	81	44	1898.5	6	53.0 W.	+4.0	7	21 W.	Do.
Do.....	45	19	81	44	1897.8	6	54.0 W.	+4.0	7	25 W.	W. J. Stewart.
Silbow Rock.....	45	21	80	03	1890.4	5	56.0 W.	+3.8	6	53 W.	Do.
Mink Islands.....	45	22	80	25	1890.5	5	06.0 W.	+3.8	6	03 W.	Boulton & Stewart.
Fitzwilliam Island, Southwest Point.	45	26	81	49	1899.8	4	30.5 W.	+4.1	4	54 W.	W. J. Stewart.
Indian Harbor.....	45	27	81	48	1899.8	4	36.0 W.	+4.1	4	59 W.	Do.
Rattlesnake Harbor.	45	32	81	43	1899.8	6	22.7 W.	+4.1	6	46 W.	F. Anderson.
Point au Baril Har- bor.	45	33	80	30	1889.5	5	09.0 W.	+3.9	6	11 W.	Captain Boulton.
Club Island.....	45	34	81	36	1900.8	6	32.0 W.	+4.1	6	51 W.	W. J. Stewart.
South Bay Mouth...	45	34	82	00	1899.4	3	47.0 W.	+4.1	4	12 W.	F. Anderson.
Erie Shingle.....	45	34	81	38	1884.8	4	45.0 W.	+4.0	6	08 W.	Captain Boulton.
Providence Bay.....	45	39	82	17	1898.7	4	25.0 W.	+4.2	4	54 W.	F. Anderson.
Outer Duck Island...	45	39	82	56	1897.7	2	07.5 W.	+4.3	2	41 W.	J. F. Fraser.
Great Duck Island ..	45	39	82	56	1897.8	2	00.2 W.	+4.3	2	33 W.	Do.
Fanny Island .....	45	44	81	48	1885.7	3	41.0 W.	+4.2	5	04 W.	Captain Boulton.
Macnab Rocks.....	45	45	80	39	1888.0	4	19.0 W.	+3.9	5	27 W.	Boulton & Campbell.
Western Duck Island	45	45	82	57	1897.7	3	00.0 W.	+4.3	3	34 W.	J. F. Fraser.
Misery Bay.....	45	47	82	45	1898.6	3	18.0 W.	+4.4	3	48 W.	F. Anderson.
Burnt Island .....	45	49	82	57	1897.7	3	07.2 W.	+4.4	3	41 W.	J. F. Fraser.
West Bay, Indian Village.	45	50	82	10	1886.4	5	12.0 W.	+4.2	6	32 W.	Captain Boulton.
Squaw Island, West Rock.	45	50	81	29	1884.9	1	07.0 W.	+4.1	2	31 W.	Do.
West Mound.....	45	50	81	39	1885.4	3	42.0 W.	+4.2	5	06 W.	Do.
Gull Island.....	45	51	81	16	1885.4	5	02.0 W.	+4.0	6	22 W.	D. C. Campbell.
Murray Rocks.....	45	52	80	48	1886.7	5	38.0 W.	+4.0	6	53 W.	Boulton & Campbell.
Mississauga Straits ..	45	52	83	18	1897.6	4	39.8 W.	+4.4	5	15 W.	J. F. Fraser.
Manitoulin Island...	45	53	83	13	1897.6	3	27.0 W.	+4.4	4	02 W.	Do.
Ridant Island.....	45	54	80	56	1886.6	7	20.0 W.	+4.0	8	36 W.	Captain Boulton.
Little Cockburn Is...	45	54	83	30	1897.8	3	28.6 W.	+4.5	4	04 W.	J. F. Fraser.
Henry Island.....	45	55	82	46	1887.7	3	58.0 W.	+4.4	5	16 W.	Captain Boulton.
Gore Bay Harbor....	45	55	82	28	1887.4	3	32.0 W.	+4.2	4	48 W.	Do.
Graburn Island.....	45	55	80	55	1886.7	6	50.0 W.	+4.0	8	05 W.	D. C. Campbell.
Kokanongwi Shingle	45	56	81	34	1885.5	2	51.0 W.	+4.1	4	13 W.	Do.
Gore Bay light-house.	45	57	82	29	1885.5	6	02.0 W.	+4.3	7	28 W.	Captain Boulton.
Strawberry light- house.	45	58	81	51	1885.6	3	46.0 W.	+4.2	5	10 W.	D. C. Campbell.
Little Current.....	45	59	81	55	1900.8	4	23.4 W.	+4.2	4	43 W.	F. Anderson.
Beverly Island .....	46	00	82	15	1886.8	5	02.0 W.	+4.3	6	22 W.	Campbell & Stewart.
Bedford Island.....	46	02	82	01	1885.7	3	43.0 W.	+4.2	5	06 W.	Boulton & Stewart.
Grant Island .....	46	09	83	18	1886.5	2	43.0 W.	+4.4	4	07 W.	Captain Boulton.
Aird Island.....	46	09	82	22	1887.8	3	44.0 W.	+4.3	5	00 W.	Do.
St. Joseph Island, Hilton.	46	16	83	54	1889.4	2	38.0 W.	+4.6	3	52 W.	W. J. Stewart.
St. Joseph Island, Gravel Point.	46	16	83	50	1889.4	2	36.0 W.	+4.6	3	50 W.	Do.
Forshaw Island .....	46	20	84	05	1889.5	2	51.0 W.	+4.6	4	05 W.	Do.
Victoria Island.....	48	05	89	22	1903.0	3	30.0 E.	+5.4	3	19 E.	Do.
Thunder Cape.....	48	18	88	56	1903.0	3	20.0 E.	+5.5	3	09 E.	Do.
Montreal .....	45	30	78	50	1896.8	14	19.0 W.	+3.0	14	45 W.	R. L. Faria.

COAST AND GEODETIC SURVEY, SERIES 4.

MINNESOTA.											
Duluth .....	46	46	92	04	1891.6	12	46.9 E.	+4.9	11	39 E.	J. B. Baylor.
St. Paul.....	44	58	93	05	1891.6	9	21.4 E.	+4.7	8	16 E.	Do.
St. Paul, Snelling Avenue.	45	00	93	10	1900.8	8	41.4 E.	+4.7	8	19 E.	J. W. Miller.
Watopa.....	44	14	92	02	1893.6	7	14.1 E.	+4.6	6	19 E.	W. R. Hoag.
Lake City.....	44	23	92	08	1893.7	7	02.2 E.	+4.6	6	08 E.	Do.
WISCONSIN.											
Milton.....	42	47	88	55	1900.7	4	20.0 E.	+4.4	3	59 E.	Albert Whitford.
Madison.....	43	04	89	25	1900.8	4	53.0 E.	+4.5	4	32 E.	W. G. Cady.



TABLE III.—Recent magnetic declinations in lake region reduced to July, 1905—Cont'd.

COAST AND GEODETIC SURVEY, SERIES 4—Continued.

Station.	Latitude.		Longitude.		Date.	Observed declination.		Annual change.	Computed declination, 1905.5.		Observer.
WISCONSIN—cont'd.	°	'	°	'		°	'		°	'	
Milwaukee.....	43	04	87	53	1888.6	4	22.3 E.	+4.4	3	08 E.	J. B. Baylor.
Sheboygan.....	43	44	87	43	1900.4	3	15.0 E.	+4.6	2	52 E.	L. Bode.
Do.....	43	45	87	42	1894.0	3	20.0 E.	+4.6	2	27 E.	County surveyor.
Mauston.....	43	46	90	04	1900.5	4	53.0 E.	+4.7	4	29 E.	Government surveyor.
La Crosse.....	43	50	91	14	1900.8	5	31.8 E.	+4.6	5	10 E.	W. G. Cady.
New Holstein.....	43	57	88	05	1895.0	4	40.0 E.	+4.6	3	52 E.	County surveyor.
Kewaunee.....	44	28	87	30	1901.2	2	36.0 E.	+4.7	2	16 E.	W. T. Rooney.
Maxville.....	44	32	91	58	1893.6	6	47.7 E.	+4.7	5	52 E.	W. R. Hoag.
Malden Rock.....	44	33	92	12	1893.5	6	59.1 E.	+4.7	6	03 E.	Do.
Green Bay.....	44	30	87	59	1891.6	4	00.9 E.	+4.7	2	55 E.	J. B. Baylor.
Door County.....	45	00	87	22	1901.2	2	30.0 E.	+4.7	2	10 E.	C. M. Whiteside.
Oconto County.....	45	00	88	15	1900.5	2	30.0 E.	+4.8	2	06 E.	E. Fitzgerald.
Prentice.....	45	32	90	17	1891.6	4	07.3 E.	+4.8	3	00 E.	J. B. Baylor.
Tomahawk.....	45	47	89	36	1900.4	3	27.0 E.	+4.9	3	02 E.	D. H. Vaughn.
Vilas.....	46	06	89	38	1900.5	8	33.0 E.	+4.9	3	08 E.	Do.
MICHIGAN.											
Sturgis.....	41	48	85	26	1900.8		43.5 E.	+3.9		25 E.	W. C. Dibrill.
Adrian.....	41	53	84	01	1896.0		14.0 E.	+3.8		22 W.	County surveyor.
Monroe.....	41	53	83	25	1895.0	1	15.0 W.	+3.8	1	55 W.	Do.
St. Joseph County.....	41	55	85	36	1901.0	1	15.0 E.	+4.0		57 E.	O. H. Todd.
Hillsdale.....	41	56	84	39	1896.0		26.0 E.	+3.9		11 W.	G. A. Mark.
Penn.....	41	57	85	57	1896.0	1	40.0 E.	+4.0	1	02 E.	F. E. Smith.
Ypsilanti.....	42	14	83	36	1900.5	2	13.0 W.	+3.8	2	32 W.	C. S. Woodward.
T. 2 S., R. 3 E.....	42	19	84	04	1897.3		17.0 W.	+3.8		48 W.	Do.
Kalamazoo.....	42	19	85	34	1900.9	1	12.3 E.	+4.0		54 E.	W. G. Cady.
Detroit.....	42	20	82	58	1900.9	1	12.0 W.	+3.8	1	29 W.	Do.
Allegan.....	42	32	85	51	1893.0		55.0 E.	+4.2		03 E.	County surveyor.
Pontiac.....	42	37	83	19	1895.0		28.0 W.	+3.9	1	09 W.	Do.
Hastings.....	42	38	85	18	1901.0		00.0	+4.0		18 W.	L. S. Cobb.
Agricultural College.....	42	45	84	31	1901.3		29.0 W.	+4.0		46 W.	H. K. Vedder.
Ionia County.....	42	56	85	04	1895.0		30.0 E.	+4.1		13 W.	County surveyor.
Elsie.....	43	06	84	25	1901.2		35.0 W.	+4.1		53 W.	Charles Eddy.
Mount Pleasant.....	43	26	84	47	1895.0		30.0 W.	+4.2	1	14 W.	County surveyor.
Big Rapids.....	43	42	85	28	1900.7		27.0 E.	+4.4		06 E.	L. W. June.
Pentwater.....	43	47	86	25	1895.0	1	45.0 E.	+4.5		58 E.	H. A. Grant.
Standish.....	43	58	83	59	1895.0	2	00.0 W.	+4.2	2	44 W.	County surveyor.
Manistee.....	44	15	86	20	1900.6	1	30.0 E.	+4.6	1	07 E.	S. H. Baker.
North Branch.....	44	40	83	53	1900.3	1	08.0 W.	+4.4	1	31 W.	F. A. Sickelsteel.
Fairview.....	44	45	84	02	1900.9	1	32.0 W.	+4.3	1	52 W.	E. P. Albertson.
Menominee.....	45	10	87	38	1901.0	1	55.0 E.	+4.8	1	33 E.	Albert Hass.
Mackinac.....	45	51	84	38	1880.6		20.5 W.	+4.6	2	17 W.	J. B. Baylor.
Delta County.....	45	56	86	54	1895.0		13.0 E.	+4.7		36 W.	Mean 11 stations.
Marquette.....	46	33	87	22	1891.6	2	52.0 E.	+5.1	1	41 E.	J. B. Baylor.
Ontonagon.....	46	51	89	20	1895.0	3	00.0 E.	+5.1	2	06 E.	County surveyor.
ILLINOIS.											
Bloomington.....	40	31	88	59	1891.7	4	00.4 E.	+4.0	3	05 E.	J. B. Baylor.
Minonk.....	40	55	89	02	1901.2	4	05.0 E.	+4.1	3	47 E.	D. H. Davidson.
Ottawa.....	41	20	88	50	1891.7	5	02.5 E.	+4.2	4	04 E.	J. B. Baylor.
Chicago.....	41	56	87	37	1900.9	3	57.8 E.	+4.2	3	39 E.	W. G. Cady.
Rockford.....	42	17	89	06	1891.7	3	59.9 E.	+4.3	3	01 E.	J. B. Baylor.
Woodstock.....	42	18	88	26	1901.2	3	13.0 E.	+4.3	2	55 E.	C. H. Tryon.
INDIANA.											
Hartford City.....	40	29	85	23	1900.8	1	56.6 E.	+3.7	1	40 E.	W. C. Dibrill.
Fort Wayne.....	41	06	85	08	1900.8		12.8 E.	+3.7		04 W.	Do.
Warsaw.....	41	12	85	52	1900.8	1	00.4 E.	+3.8		42 E.	Do.
South Bend.....	41	40	86	14	1900.8	1	25.4 E.	+3.9	1	07 E.	Do.
Michigan City.....	41	42	86	58	1900.9	1	45.6 E.	+4.1	1	27 E.	W. G. Cady.
OHIO.											
Bellefontaine.....	40	22	83	46	1900.5		07.8 E.	+3.7		11 W.	J. W. Miller.
Tuscarawas.....	40	24	81	24	1900.5	2	15.1 W.	+3.5	2	33 W.	J. A. Fleming.
Marion.....	40	34	83	07	1900.5		34.2 W.	+3.6		52 W.	J. W. Miller.
Ashland.....	40	54	82	20	1900.6	1	01.0 W.	+3.7	1	19 W.	Do.
Akron.....	41	05	81	33	1900.6	2	25.2 W.	+3.6	2	43 W.	Do.
Warren, S. M.....	41	15	80	50	1900.6	3	12.7 W.	+3.6	3	31 W.	Do.
Warren, N. M.....	41	15	80	50	1900.6	2	13.6 W.	+3.6	2	32 W.	Do.
Cleveland.....	41	30	81	42	1900.6	3	10.0 W.	+3.7	3	28 W.	Do.
Jefferson.....	41	44	80	48	1900.6	3	05.4 W.	+3.6	3	23 W.	Do.
Chardon.....	41	35	81	15	1901.0	3	15.0 W.	+3.6	3	31 W.	E. L. F. Phelps.



TABLE III.—Recent magnetic declinations in lake region reduced to July, 1905—Cont'd.

COAST AND GEODETIC SURVEY, SERIES 4—Continued.

Station.	Latitude.	Longitude.	Date.	Observed declination.	Annual change.	Computed declination, 1905.5.	Observer.
PENNSYLVANIA.							
Erie .....	42 09	80 05	1885.7	3 08.2 W.	+3.6	4 19 W.	J. B. Baylor.
Ridgway .....	41 26	78 43	1901.0	5 22.0 W.	+3.3	5 37 W.	A. B. Little.
Johnsonburg .....	41 29	78 41	1899.0	5 19.0 W.	+3.3	5 40 W.	Do.
Tionesta .....	41 30	79 31	1895.0	3 45.0 W.	+3.4	4 21 W.	County surveyor.
NEW YORK.							
Hamburg .....	42 43	78 49	1892.5	3 30.0 W.	+3.5	4 16 W.	E. S. Nott.
Buffalo .....	42 53	78 54	1893.3	5 20.0 W.	+3.5	6 03 W.	Do.
Warsaw .....	42 44	78 10	1895.0	5 15.0 W.	+3.4	5 51 W.	County surveyor.
Utica .....	43 04	75 12	1900.6	10 07.0 W.	+3.0	10 22 W.	E. D. Rich.
Lockport to Olcott ..	43 14	78 45	1900.0	5 30.0 W.	+3.5	5 49 W.	R. R. engineers.
Services Patent, northeast corner ..	43 20	75 05	1899.6	10 11.1 W.	+3.0	10 29 W.	State surveyor.
Herkimer-Hamilton counties .....	43 32	74 47	1900.5	10 12.0 W.	+3.0	10 27 W.	Mean of 24.
Big Moose Lake .....	43 51	74 49	1900.6	10 41.0 W.	+3.0	10 56 W.	Wm. P. Judson.
Sacketts Harbor .....	43 57	76 08	1895.5	9 59.0 W.	+3.2	10 31 W.	Do.
Herkimer-Hamilton counties .....	44 01	74 49	1900.7	11 05.0 W.	+3.0	11 19 W.	C. H. Flanigan.
Elizabethtown .....	44 15	73 36	1900.0	12 58.0 W.	+3.0	13 15 W.	J. W. Steele.
Ithaca .....	42 27	76 29	1890.8	6 31.5 W.	+3.2	7 19 W.	J. B. Baylor.
Do .....	42 27	76 29	1895.0	6 58.0 W.	+3.2	7 30 W.	City engineer.

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Toledo .....	41 42	83 27	1903.0	1 00.0 W.	+3.8	1 08 W.
Maumee .....	41 34	83 39	.....	44.7 W.	+3.7	52 W.
Fremont .....	41 23	83 06	.....	1 00.8 W.	+3.7	1 08 W.
Sandusky .....	41 31	82 43	.....	55.8 W.	+3.7	1 03 W.
Port Clinton .....	41 32	82 58	.....	1 05.7 W.	+3.7	1 13 W.
Put in Bay .....	41 41	82 51	.....	50.4 W.	+3.7	58 W.
Kelleys Island .....	41 38	82 44	.....	53.8 W.	+3.7	1 01 W.
Norwalk .....	41 15	82 38	.....	1 06.2 W.	+3.7	1 13 W.
Oberlin .....	41 18	82 16	.....	1 59.9 W.	+3.7	2 07 W.
Elyria .....	41 22	82 10	.....	2 08.5 W.	+3.7	2 15 W.
Berea .....	41 24	81 51	.....	2 31.4 W.	+3.7	2 38 W.

In Table IV the declinations are compared at a number of places as observed recently, and at some time in the past varying from fourteen to forty years. The table shows that the change of declination has been nearly uniform over the whole lake region for the past thirty years and in that time has changed about two degrees, the west declinations increasing and the east declinations decreasing by that amount.

TABLE IV.—Change of magnetic declination in region of Great Lakes.

Station.	Year.	Declination.	Change in declination.	Number of years.	Change yearly.
<hr/>					
St. Paul .....	1873.0	10 55.8 E.	.....	.....	.....
.....	1891.0	9 21.4 E.	+1 34.4	18	+5.2
La Crosse .....	1876.0	8 00.7 E.	.....	.....	.....
.....	1900.0	5 31.8 E.	+2 28.9	24	+6.2
North base Minnesota Point .....	1871.0	10 40.0 E.	.....	.....	.....
.....	1901.0	8 15.0 E.	+2 25.0	30	+4.8
Ontonagon .....	1859.0	5 03.2 E.	.....	.....	.....
.....	1880.6	4 41.5 E.	.....	.....	.....
.....	1904.0	3 02.3 E.	+2 00.9	45	+2.7
Marquette .....	1859.0	4 01.3 E.	.....	.....	.....
.....	1873.0	4 30.7 E.	.....	.....	.....
.....	1904.0	1 36.5 E.	+2 54.2	31	+5.6
Copper Harbor .....	1873.0	4 08.3 E.	.....	.....	.....
.....	1904.0	1 31.8 E.	+2 31.5	31	+4.9
Sault Ste. Marie .....	1873.0	04.9 W.	.....	.....	.....
.....	1895.0	2 16.5 W.	+2 11.6	22	+6.0

TABLE IV.—Change of magnetic declination in region of Great Lakes—Continued.

Station.	Year.	Declination.	Change in declination.	Number of years.	Change yearly.
		° ' "	° ' "		' "
Mackinac Island .....	1860.0	1 42.4 E.			
	1880.0	20.5 W.	+2 02.9	20	+6.1
	1897.0	1 48.3 W.	+1 27.8	17	+5.2
Northport .....	1860.0	2 33.7 E.			
	1896.7	40.5 W.	+3 14.2	36	+5.4
South Manitou Island .....	1860.0	3 09.1 E.			
	1897.0	25.0 E.	+2 44.1	37	+4.4
Beaver Island .....	1860.0	2 43.0 E.			
	1897.0	04.8 E.	+2 38.2	37	+4.3
Milwaukee .....	1888.0	4 22.3 E.			
	1904.0	3 26.4 E.	+0 55.9	16	+3.5
Madison .....	1878.0	6 31.8 E.			
	1900.0	4 53.0 E.	+1 38.3	22	+4.5
Rockford .....	1876.0	5 18.3 E.			
	1891.0	3 59.9 E.	+1 18.4	15	+5.2
Lake City.....	1876.0	8 04.3 E.			
	1893.6	7 02.2 E.	+1 02.1	17	+3.7
	1859.0	4 24.2 E.			
Grand Haven.....	1873.0	3 28.2 E.	+0 56.0	14	+4.0
	1904.0	1 10.4 E.	+2 17.8	31	+4.4
	1859.0	5 26.6 E.			
Michigan City.....	1873.0	3 59.0 E.	+1 27.6	14	+6.3
	1904.0	1 50.2 E.	+2 08.8	31	+4.2
	1858.0	1 02.0 E.			
Sturgeon Point .....	1901.0	1 24.0 W.	+2 26.0	43	+3.4
Ausable.....	1859.0	18.0 E.			
Forestville .....	1873.0	1 30.7 W.	+1 48.7	14	+7.8
Sand Beach.....	1901.5	2 41.5 W.	+1 10.8	28	+2.5
Fort Gratiot .....	1858.0	1 20.0 E.			
	1860.0	1 23.5 W.			
	1873.0	37.0 W.			
	1903.0	3 02.1 W.	+2 25.1	30	+4.8
Goderich .....	1860.0	1 42.4 W.			
	1901.0	4 11.0 W.	+2 28.6	41	+3.6
Detroit .....	1859.0	42.0 E.			
	1872.0	25.2 E.			
	1873.0	17.3 E.			
	1876.0	04.7 E.	+ 37.8	17	+2.2
	1901.0	59.1 W.			
	1904.0	1 15.4 W.	+1 20.1	28	+2.9
	1873.0	2 00.7 W.			
Erie .....	1903.0	4 24.4 W.	+2 23.7	30	+4.8
	1872.0	3 52.4 W.			
Buffalo .....	1873.0	3 58.3 W.			
	1903.0	6 21.2 W.	+2 22.9	30	+4.8
	1859.0	2 07.4 W.			
Toronto .....	1896.0	4 26.8 W.	+2 19.4	36	+3.9
	1903.0	5 36.0 W.	+1 09.2	8	+8.6
	1872.0	3 44.4 W.			
Charlotte.....	1873.0	3 46.2 W.			
	1903.0	6 21.0 W.	+2 36.6	31	+5.0
Montreal .....	1859.0	12 21.0 W.			
	1879.0	13 40.5 W.	+1 19.5	20	+4.0
	1896.0	14 19.0 W.	+ 38.5	17	+2.3

CHANGE OF DIP.

In Table V values of the dip are compared for a number of places in the lake region as observed at intervals varying from fourteen to forty-five years in different instances. It is gathered from this table that in the lake region as a whole the dip has diminished steadily during the past thirty years at the rate of about one minute of arc per year.

The range in dip at the present time is from 72° 22' at Michigan City, at the south end of Lake Michigan, in latitude 41° 43', to 77° 34' on Isle Royal, in the northern part of Lake Superior, in latitude 47° 52'.

TABLE V.—*Change of magnetic dip in region of Great Lakes.*

Station.	Year.	Dip.		Change in dip.	Num- ber of years.
		°	'		
Copper Harbor, Mich .....	1859	78	06.0		
	1873	78	02.0	—04	14
	1904	77	34.0	—28	31
Ontonagon, Mich .....	1859	77	27.0		
	1904	77	00.0	—27	45
Marquette, Mich.....	1859	77	17.0		
	1873	75	48.0		
	1904	76	10.0		
Mackinac Island, Mich.....	1860	76	43.0		
	1897	76	08.0	—35	37
Northport, Mich .....	1860	76	06.0		
	1897	75	45.0	—21	37
South Manitou Island, Mich.....	1860	76	01.0		
	1897	75	32.0	—29	37
Beaver Island, Mich .....	1860	76	43.0		
	1897	76	06.0	—37	37
Milwaukee, Wis. (new station).....	1859	73	57.0		
	1873	73	43.0	—14	14
	1904	73	42.0		
Grand Haven, Mich .....	1859	74	10.0		
	1873	73	58.0	—12	14
	1904	73	46.0	—12	31
Michigan City, Ind .....	1859	73	02.0		
	1873	72	43.0	—19	14
Detroit, Mich .....	1904	72	22.0	—21	31
	1859	73	41.0		
	1860	73	43.0		
Toronto, Ont.....	1872	73	85.0		
	1873	73	34.0	—07	14
	1876	73	34.0		
	1904	73	09.0	—25	31
	1859	75	24.0		
	1903	74	32.3	—52	44

CHANGE OF MAGNETIC INTENSITY.

In Table VI the horizontal and total intensity of the earth's magnetic force is shown at eight places in the lake region for the years 1859, 1873, and 1904. The average total intensity for the eight stations in 1904 is 0.613 of a dyne. In thirty years there has been a decrease of 0.03 of a dyne in the total intensity, or about a twentieth part of the whole value.

The horizontal intensity of force shows only a slight diminution in thirty years, the decrease of half a degree in the dip in thirty years tending to maintain the horizontal intensity nearly constant. The horizontal intensity is the total intensity divided by the secant of the dip.

The horizontal intensity, which is the directive force of the compass needle, is about one-half greater along the lower part of the lake region than in the upper part on Lake Superior.

TABLE VI.—*Change of magnetic intensity in lake region.*

Station.	Year.	Horizon- t al in- tensity.	Change in hori- zontal intensity.	Total in- tensity.	Change in total intensity.	Num- ber of years.
		<i>Dyne.</i>	<i>Dyne.</i>	<i>Dyne.</i>	<i>Dyne.</i>	
Copper Harbor, Mich.....	1859	0.1834		0.6470		
	1873	.1350		.6509		
	1904	.1322	—0.0028	.6137	—0.0372	31
Ontonagon, Mich.....	1859	.1413		.6501		
	1904	.1406	— .0007	.6261	— .0250	45
Marquette, Mich.....	1859	.1424		.6471		
	1873	.1583		.6451		
	1904	.1461	— .0122	.6111	— .0340	31
Milwaukee, Wis .....	1859	.1779		.6435		
	1873	.1797		.6409		
	1904	.1703	— .0094	.6067	— .0342	31
Grand Haven, Mich .....	1859	.1759		.6449		
	1873	.1775		.6427		
	1904	.1710	— .0065	.6116	— .0311	31
Michigan City, Ind .....	1859	.1850		.6358		
	1873	.1886		.6349		
	1904	.1847	— .0039	.6096	— .0253	31
Detroit, Mich .....	1859	.1770		.6321		
	1860	.1782		.6356		
	1872	.1789		.6326		
	1873	.1789		.6324		
	1876	.1797		.6354		
	1904	.1763	— .0034	.6084	— .0270	28
Toledo, Ohio.....	1904	.1832				
Toronto, Ontario.....	1859	.1605		.6363		
	1901	.1650	+ .0045	.6187	— .0176	42

MAGNETIC STORMS.

Magnetic storms prevail at times over the whole earth. These storms consist of rapid and irregular changes in the magnetic declination, dip, and intensity. A great storm of this kind was noted while observations of declination were being made October 31, 1903, near Fort Gratiot light-house, south end of Lake Huron. According to the traces of magnetograph at the Toronto Magnetical Observatory, kindly furnished by the director, Mr. R. F. Stupart, this storm began at midnight of October 30–31, and lasted about twenty-four hours. The declination from 3.40 to 4.48 a. m., ninetieth meridian time, changed 3 degrees and 7 minutes. The declination kept changing irregularly during the whole of the day, the horizontal force likewise showing great changes. Such great magnetic disturbances as that of October 31, 1903, are, however, of very rare occurrence. As far as known the effects of magnetic storms on the compasses of steamers while traversing the Lakes have never been noticed.

TEMPERATURE OF WATER SURFACE, LAKE SUPERIOR.

On a line from Portage Lake Ship Canal, Keweenaw Point, to Grace Harbor, at the west end of Isle Royal, a distance of 53 miles, the temperature of the surface water of lake was observed while crossing in a steamer on August 20, and returning August 24. The temperatures were as follows:

Distance from ship canal.	Tempera- ture.
<i>Miles.</i>	<i>° F.</i>
5.4	57.7
7.8	54.2
11.8	49.6
17.1	49.4
22.9	49.6
29.4	49.2
34.8	50.8
39.1	50.6
43.6	51.0
47.5	50.4
51.9	52.1

2808 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

At a point half a mile north of Washington Island, near west end of Isle Royal, where the temperature of surface water was 54.7° F. at the bottom, a depth of 80 feet, it was 46.8° F. on August 22.

At 22.9 miles from ship canal, where the surface water was 49.6° F., the water at a depth of 100 feet was 44.6° F. on August 24. The water at depth was obtained by lowering a heavy empty bottle with weight attached and then drawing the rubber stopper. The bottle was cooled to the temperature of surface water before lowering in the lake.

Very respectfully, your obedient servant,

Maj. LANSING H. BEACH,  
*Corps of Engineers, U. S. Army.*

THOMAS RUSSELL,  
*Assistant Engineer.*

## APPENDIX F F F.

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IMPROVEMENT OF YELLOWSTONE NATIONAL PARK, INCLUDING THE  
CONSTRUCTION, REPAIR, AND MAINTENANCE OF ROADS AND  
BRIDGES.

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REPORT OF MAJ. H. M. CHITTENDEN, CORPS OF ENGINEERS, OFFICER  
IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905.

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UNITED STATES ENGINEER OFFICE,  
*Yellowstone Park, Wyo., July 15, 1905.*

GENERAL: I have the honor to transmit herewith report upon  
improvement of Yellowstone National Park for the fiscal year ending  
June 30, 1905.

Very respectfully, your obedient servant,

H. M. CHITTENDEN,  
*Major, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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### IMPROVEMENT OF YELLOWSTONE NATIONAL PARK.

The work which has been done during the past fiscal year and which  
will be practically completed by the close of the present season has  
been carried on under the appropriation of April 28, 1904, and that  
of March 3, 1905. The following are the main features of this work:

#### RECONSTRUCTION AND IMPROVEMENT OF EXISTING ROADS.

Beginning at about the eleventh milepost from Mammoth Hot  
Springs on the road to Norris, the road was practically reconstructed  
by correction of grades and thorough resurfacing with a foundation  
of broken rock over all soft ground. The same character of work was  
carried on from Norris Geyser Basin to Gibbon Canyon and was par-  
ticularly thorough over the marshy tracts known as Elk Park and the  
Gibbon Meadows.

From Excelsior Geyser to the Upper Geyser Basin similar work  
was done, all the sharp pitches being cut out and evened up so as to  
reduce them to an easy gradient.

From the Upper Geyser Basin to Craig Pass on the Continental Divide much work of a similar character was done.

A large portion of the road along the Yellowstone River between the Lake and the Grand Canyon has been resurfaced with a foundation of rock and a wearing surface of gravel.

The road from Norris to the Grand Canyon, which is the most unsatisfactory location in the park, never having been laid out on any rational system, was largely improved by cutting down the hills and filling the hollows, widening and surfacing and otherwise compensating as far as possible for the defects of the original location. In particular, the road down the high hill at the Grand Canyon was relocated so as to give an easy gradient. This stretch of road lies entirely in heavy clay deposits and is exceedingly hard to maintain during the periods of wet weather. It was heavily paved with broken rock which was covered with gravel, and it is believed that it will stand in good shape.

The road from Thumb Station to Lake Outlet, by way of Natural Bridge, was completed by grading to full width and surfacing with the best material available. Along the lake shore at the Thumb the alignment was in many places corrected so as to shorten the distance and even up the gradients.

The road across the summit of Mount Washburn was completed, including both the low line through Dunraven Pass and the high line passing over the summit of the mountain. This road has been one of great difficulty of construction, not only because of the general presence of solid rock in all portions, but particularly because of the shortness of season and the very wet condition of the ground until late in the summer. The road over the summit has been made 18 to 20 feet wide, instead of 12 feet as contemplated in the original estimate. This road, it is fully believed, will meet all the expectations of those who have favored its construction and will form one of the finest attractions in the tour of the park.

From Tower Falls to Mammoth Hot Springs the road has been entirely opened and completed as a permanent part of the system, thus completing the belt line or general circuit.

Much work was done on the Cooke City road from Yellowstone River to the northeast boundary of the park. An entirely new alignment was made from the Yellowstone River to near Soda Butte, the road crossing the Lamar River near the mouth of Slough Creek, instead of near the mouth of Soda Butte Creek as formerly.

The road from the Grand Canyon to Inspiration Point, which serves to give a fine view of the Grand Canyon, has been largely widened and otherwise improved.

The road opened early last season from the steel-concrete bridge over the Yellowstone to Artist Point has been fully widened and completed.

On the East road a large amount of work has been done from Sylvan Pass, 12 miles east, where it was too narrow for safe travel.

Considerable work has also been done on the West road in the matter of widening it in narrow places and resurfacing and otherwise improving its condition.



## BRIDGES.

The following bridges have been built during the period above mentioned:

The 5-span steel-arch bridge over the Middle Gardiner River, which was in progress of erection at the date of the last annual report, was duly completed.

The steel truss over the same river at the 7-mile post between Mammoth Hot Springs and Norris was also constructed.

Steel-truss bridges were built over Nez Perce Creek near the Fountain Hotel, and over the Firehole River above Excelsior Geyser.

A fine steel-arch bridge was erected over Tower Creek where the road crosses a short distance above Tower Falls.

A number of wooden bridges were also built, the principal ones being the following:

A large crib structure without trusses over the Lamar River on the Cooke City road.

Bridges over the Big and Little Blacktail creeks on the road between Mammoth Hot Springs and Tower Falls.

Reconstruction of the bridge over the Gibbon River at Norris.

Reconstruction of two bridges over the Firehole River, one on the old road from the Lower Basin to Excelsior Geyser, and the other just above the upper Geyser Basin.

Relocation and reconstruction of bridges over Trout and Antelope creeks.

Construction of a new bridge over Grinnell Creek on the East road, and the construction of a viaduct by which the road down the mountain on the east side of Sylvan Pass is made to pass over itself in order to secure the necessary reduction of gradient.

Numerous small bridges have been built or reconstructed and most of the existing wooden bridges have been redecked.

## CULVERTS.

The policy of the replacing of wooden culverts with vitrified clay pipe has been steadily continued, until this work now extends over a greater part of the system.

## SPRINKLING.

The sprinkling system heretofore inaugurated has been extended until it now covers 100 miles of road, in accordance with the existing project. The system has given very general satisfaction and works in admirably with the maintenance and repair of the roads.

## STATION HOUSES.

Three station houses were built at different points in the park for the use of the superintendent, and small quarters for officers' use were erected at eleven of the stations.

## GUARD RAILS, ETC.

Guard rails, fences, etc., have been erected at numerous places around the Grand Canyon and an inclined stairway built for the convenience of tourists in descending the canyon on the right bank a short distance below the falls. Guard rails have also been built around the Paint Pots at the fountain and around Mud Geyser.

## SIGNS.

The mileposts and signboards at the road junctions and some other signs have all been repainted.

## MAMMOTH HOT SPRINGS.

The grounds at Mammoth Hot Springs have been maintained and the effort to improve conditions at this point has been highly successful; in fact, the improvements amount to a complete revolution to the former unsatisfactory state of things.

## GARDINER ENTRANCE.

The improvements at the north entrance to the park have also been maintained and are in a satisfactory condition. The Northern Pacific has recently done considerable work at this point under the supervision of this Office.

## ALFALFA FIELD.

The alfalfa field, which was established for the use of the superintendent in the maintenance of game in the northern part of the park, has proven very successful, and has made a great addition to the appearance of the roadway for three-fourths of a mile from the north entrance.

## PLANT.

The plant pertaining to the work has been brought to a satisfactory state of completeness and, together with the buildings at Mammoth Hot Springs, forms an ample provision for any future work that is likely to be required.

*Money statement.*

July 1, 1904, balance unexpended .....	\$234, 124. 11
Amount received from Department of Agriculture for work done for the Weather Bureau .....	523. 15
Amount appropriated by sundry civil act approved March 3, 1905 .....	133, 000. 00
	<hr/>
	367, 647. 26
June 30, 1905, amount expended during fiscal year .....	232, 085. 85
	<hr/>
July 1, 1905, balance unexpended .....	135, 561. 41
July 1, 1905, outstanding liabilities .....	28, 602. 62
	<hr/>
July 1, 1905, balance available .....	106, 958. 79
	<hr/> <hr/>
{ Amount that can be profitably expended in fiscal year ending June 30, 1907, for maintenance and repairs, in addition to the balance unexpended July 1, 1905 .....	75, 000. 00

## ESTIMATES.

The work which was undertaken under the continuing appropriation four years ago has been practically completed, and there has also been done considerable work not contemplated in the original estimates. All the roads which it has ever been proposed to build are now open to travel. The road over the summit of Mount Washburn, from Dunraven Pass to the north side of the mountain, 7 miles, has been made an 18 to 20 foot road nearly all the way, instead of a 12-foot road as at first planned. Only a few minor changes of location in some of the older roads remain to be made, and the eastern and southern approaches will not require general enlargement until railway facilities in those directions are materially advanced beyond their present condition. The sprinkling system has been developed to the full extent contemplated, and has largely mitigated the dust annoyance on the main circuit. There are but few portions of the roads that can not now be traveled with speed, safety, and comfort equal to what it was hoped to obtain with the funds granted by Congress.

The estimate herewith submitted is, therefore, for maintenance only, no additional work having been authorized by Congress. It is based upon careful records of the cost of similar work during the past fiscal year, taking into account also the considerable expansion of the system due to the completion of the road from the canyon to Mammoth Hot Springs via Mount Washburn and Tower Falls. It is made up as follows:

General work .....	\$45,000.00
Sprinkling (an average of 30 sprinklers for eighty days per season) .....	30,000.00
Total .....	75,000.00

This figure must be considered a minimum. It should be granted in a lump sum under the general head of maintenance.

## FUTURE WORK.

Having complied with official requirements in regard to estimates for the maintenance of a completed project, I desire now to submit a statement as to the future needs of this work. While the park is now provided with a thoroughly good road system, the traffic upon it is continually increasing and has, in fact, practically doubled since the work began, four years ago. It has completely outrun the expectations upon which the original estimate was based. If this increase is to continue, and the managers of the park business believe it is, a new situation is created which must be met in the near future.

*Main circuit.*—There will be first considered the main circuit or belt line, which all tourists travel, and also the northern and western approaches, which are the only ones that now have important railroad connections. The mileage is about 180 miles, including some extra roads at Mammoth Hot Springs and Gardiner.

*Width.*—The standard width of 18 feet for the road surface must be widened to at least 25 feet.

*Guard walls.*—Owing to the more frequent meeting of vehicles and the necessity of turning out where the road is on steep sidehill slopes, guard walls will have to be built in all these places. Such walls should be built in mortar and the existing retaining walls should be rebuilt in the same manner.

*Fallen timber.*—The dead and down timber should be cleared up for a width of 100 feet along each side of the roads as a precaution against forest fires and as a general improvement to the appearance of the roads.

*Bridges and culverts.*—It has been the policy during the past four years to replace worn-out bridges with concrete or steel, and culverts with vitrified clay pipe. This policy should be continued until all the old structures are so replaced.

*Ditches, etc.*—As a result of the increase of travel there has developed a strong demand on the part of the stage companies that the road grade and the ditches be so modified, wherever at all practicable, that teams may be driven off the road on one side or the other in case of meeting runaways. To carry out this requirement generally in a country like this will be an expensive matter, but when the stage companies declare it to be essential to the safety of their passengers it is difficult to resist the demand.

*Western approach.*—The great development of business on the western approach and the decision of the Union Pacific lines to build to the west boundary make necessary the immediate enlargement of that approach to the full standard of the main circuit.

*Sprinkling.*—The sprinkling system will have to be somewhat extended, although I do not think that sprinklers will be found necessary on the greater portion of the Mount Washburn division. There should be added 2 sprinklers for the road from Norris to the Canyon, 4 for the western approach, and 6 for the road between the Canyon and Mammoth Hot Springs via Tower Falls—12 sprinklers in all.

The widening of the roads and making them so that teams can drive out of them, the erection of guard walls where necessary, the reconstruction of the western approach, extension of the sprinkling system, the clearing up of dead and down timber, and the replacing of existing wooden bridges and culverts with steel and concrete or vitrified clay pipe will cost on an average for the 180 miles \$3,000 per mile, or \$540,000.

*The road surface.*—The great problem to be solved is the road-surface problem. During the past four years probably nine-tenths of the main circuit has been surfaced with one kind of material or another. In some places machine-crushed rock has been used; in others, hand-broken stone in large pieces for a foundation with some other material for a surface. Gravel has been used wherever it could be found, and where neither rock nor gravel has been available resort has been had to such local material as actual experience has shown to wear best. The results have been, on the whole, good, but not sufficient for present needs, and the greater part of the system must be redealt with in a more thorough manner.

There is a dearth of good material nearly everywhere, and an entire absence of it in many places. Wherever the cost will not be prohibitory, crushed rock should be used for both foundation and surface, and should be put in by the most approved method, and with subdrainage wherever necessary. In some few places a fine quality of natural crushed rock is found. Where rock can not be found that will stand wear and exposure, inferior rock may be used for a foundation, to be covered with the best surfacing material available. Wherever good gravel can be found it should of course be utilized to the utmost. It makes an easier road for horses than rock does, and

is altogether an excellent material. But after all these resources are exhausted there will still remain many miles where there is none of the above material within practicable distance, and where it will be necessary to rely upon a well-built dirt road. While it is not possible to make a precise division of the mileage to which these different grades of surfacing will apply, I would roughly estimate that of the 180 miles here considered, about 75 miles can be treated entirely with crushed rock, about 40 miles with rock foundation and gravel or earth surface, and about 40 miles with gravel alone. For the remaining 25 miles, where neither rock nor gravel can be had, recourse must be had to the best natural material that can be found within economical distances. Estimating a width of surfacing of 25 feet and an average depth of 8 inches, the quantity of material required will be about 3,260 cubic yards per mile. The cost of this material in place, including preparation of roadbed, rolling and finishing, and taking an average for all localities, near and remote, will be not less than \$2.50 per cubic yard for crushed rock, \$2 for mixed rock and gravel, \$1.50 for gravel, and \$1 for selected earth. Applying these figures to the above mileage gives the following results:

75 miles rock work, at \$8,150 per mile .....	\$611, 250
40 miles mixed work, at \$6,520 per mile .....	260, 800
40 miles gravel work, at \$4,890 per mile .....	195, 600
25 miles earthwork, at \$3,260 per mile .....	81, 500
Total .....	1, 149, 150

*Less important roads.*—The 170 miles of the park road system not included in the above embraces the eastern and southern approaches, the road from near Tower Falls to Soda Butte and Cooke City, and the various short side roads throughout the park. Until railroads come much nearer the park boundaries on the east and south than at present these approaches will not need material enlargement beyond their actual condition. The same is true of the Cooke City road. The side roads, where they are constantly in use, should be developed to keep pace with the rest of the system. From the present outlook I believe that the development work necessary on these roads in the next ten years ought not to exceed in cost \$150,000.

*Summary.*—The total cost, therefore, of developing the 350 miles of roads in the park system as outlined above will be:

Widening, guard walls, etc. ....	\$540, 000
Surfacing .....	1, 149, 150
Less important roads .....	150, 000
Add for contingencies, etc., 10 per cent .....	183, 915
Total .....	2, 023, 065

Or an aggregate of about \$2,000,000.

Lest the above cost, with what has already been expended on the roads, may appear excessive, I would invite attention to the fact that the cost of good macadamized roads in eastern sections of the country, where economy of construction is at a maximum, ranges from \$5,000 to \$8,000 per mile. The Government roads in Porto Rico cost about \$12,000 per mile. The total cost to date of actual construction of the 350 miles of roadway in the park is only a little over \$3,000 per mile, while the average cost of the completed system as recommended above will be about \$8,700. The cost per mile on the main circuit is of course much greater than this, and will probably average \$12,000 per



mile. But considering the remoteness of the work, the fact that all supplies have to be hauled on an average 40 miles from the railroad, the shortness of the season, which limits general work to about four months, and, lastly, the fact that the work is all in a mountainous country, where conditions are particularly unfavorable, the above cost must, I think, be considered very reasonable.

I submit for the consideration of the Department and of Congress the foregoing estimate of the probable cost of perfecting the present system of roads in the park and of bringing them up to the standard of the best European roads. Without making any definite recommendation in the premises, I believe that it would be a measure of sound economy to adopt a new project looking to the accomplishment of this work within a limited time—say ten years. It is a work which can not be indefinitely postponed. The park is growing in importance year by year and the demands upon the roads are increasing. It will be better to recognize and anticipate these needs and provide for them by a regular annual allowance than to wait until necessity compels much larger appropriations.

The annual appropriations for the work should be made, as in the past, in general terms instead of attempting to tie them up in specific allotments. The requirements of the work vary so much with the character of the season that it handicaps the management of the work to have to spend so much money, and no more or less, for each particular purpose.

#### MEMORANDUM UPON THE NEEDS OF THE ROAD SYSTEM OF THE YELLOWSTONE NATIONAL PARK.

Believing that the experience of six years in the development of the park road system may be of use to whoever may have charge of the work in the future, I have appended to this report a memorandum giving in detail my views on the general situation. The following notes do not take into account the work estimated for above, viz, road surfacing, widening and evening up, bridges and culverts except in special cases, sprinkling, clearing up of dead and down timber, nor any other work of a general character. They relate only to special work required at various localities.

*Mammoth Hot Springs to Norris.*—In widening the road through the so-called “Hoodooos,” below Golden Gate, great care should be exercised not to blast away any more of the formation. It will be better to let the right of way have an irregular alignment—being narrower in some places than in others—than to sacrifice this peculiar formation in order to get a uniform width throughout. This applies with particular force to the vicinity of the Silver Gate. If the curve at that point is considered to involve danger from the unexpected meeting of teams, it would be better to require all teams to come to a walk there than to remedy the defect by blasting out those picturesque rocks.

At various places along the road the standing timber should be cut back on the east side about 30 feet to let in the sun and hasten the melting of snow in the spring. This applies particularly to forests at about 8½ miles from the Springs, at Apollinaris Spring, Crystal Spring, and at 13, 14, and 17 miles out. Wherever these forests contain particularly fine specimens of fir or spruce, these should be preserved.

The unloading platform at Apollinaris Spring should be rebuilt and given a length of at least 100 feet. This applies also to the platforms at Kepler Cascade, Mud Geyser, and other points where the coaches stop for passengers to get out and view objects of interest.

*Norris to the fountain.*—The first hill, just beyond the Growler, can probably be brought to the adopted grade of 8 per cent by a small amount of cutting and filling and no relocation of the old road is deemed necessary. The second hill, just beyond the first milepost, can probably be dealt with better by going around it to the south. A personal reconnaissance of the ground indicates the entire practicability of such a line. If built, it should leave the present road at the foot of the first hill near the Minute Man Geyser and rejoin near the foot of the second hill at the beginning of the tangent across Elk Park.

The maintenance of the retaining wall along the Gibbon River between Elk Park and Gibbon Meadows can probably be avoided advantageously by putting the road back farther into the rock. If the wall is retained it will have to be relaid in mortar.

The road through the Gibbon Canyon, where it lies close to the water, should be raised at least 1 foot and the drainage should be so fixed that high water in the river can not, as is now the case in some places, run back through the culverts into the ditch behind the road.

*Fountain to the Upper Basin.*—The side road from near the Fountain Hotel to Firehold Lake and the Great Fountain Geyser, which leaves the main road near the Paint Pots and rejoins it at the second milepost toward the Upper Basin, is not yet sufficiently developed to prevent changes of location. The line should be finally located with much care in the vicinity of the hot springs, keeping in view the convenience of travel from the Fountain Hotel and return direct, and that going on to the Upper Basin or coming from that direction.

When the wooden bridge at Riverside Geyser, Upper Basin, requires renewal, it is a question whether it ought not to be moved downstream a few hundred feet to a very favorable site, thus eliminating an unnecessary and awkward kink in the road. The road would still pass within close view of the Riverside. Wherever located, the bridge should be ornamental in character.

*Upper Basin to Thumb.*—Through Spring Creek Canyon the road should be widened irregularly, so as not to interfere too much with the growth of willow shrubbery which forms a pleasant feature of this route. Wherever the openings in the shrubbery permit the roads should be given extra width, with narrow stretches between the clumps of willows.

There was formerly some argument advanced that this road ought to be cut through from the vicinity of Kepler Cascade directly across the hills to the present line near the sixth milepost, or still farther near the eleventh. The saving in distance would in neither case be over 2 miles, the grades not as good, the route absolutely devoid of interest, and it would still be necessary to maintain a road to the mouth of Spring Creek, 2 miles, to give access to the Lone Star Geyser. The disadvantages of the short cut would more than neutralize the gain in distance.

*Thumb to Lake Hotel.*—The four or five bridges on the last  $1\frac{1}{2}$  miles of this road, in the timber just east of the hotel, should, when worn out, be replaced by 18 and 24 inch pipe culverts and earthen embank-



ments. When these fills are made, the unevenness in the road near them should be cut out.

*Lake Hotel to Canyon.*—The small bridge over a dry ravine about  $4\frac{1}{2}$  miles below the Lake Hotel and just above the first rapids should be replaced by an embankment and an 18-inch pipe culvert.

The little hill about  $5\frac{1}{2}$  miles below the Lake Hotel and another hill a little farther down, where a branch of the Yellowstone flows around an island very close to the road and forms a fine trout pool, should each be cut down about 10 feet.

The considerable hill in the road just below the sixth milepost should be cut down to the level of the bench on which the road lies on either side of the hill. A strong timber crib should be built in the water's edge to support the road.

The bridge over Sulphur Creek and the stream next south of Otter Creek should be replaced by concrete culverts and embankments. Alum Creek and Otter Creek bridges, when rebuilt, should be shortened to 15-foot and 10-foot spans, respectively. Two short bridges on the side-hill grade along the river above the second milepost from the canyon should be replaced by 18-inch pipe culverts.

The side road from the steel-concrete bridge to Artist Point should be given extra width at the lower end, in order that coaches, after unloading at the Point, may return far enough to be out of each other's way while waiting for their passengers. All of the down timber in the narrow and picturesque valley near the Point should be gathered up and burned. Owing to the wet character of the soil along this road it will require very thorough work to make it solid in wet weather. In my judgment, the regular coaches from the lake to the canyon should turn in here and give tourists their first glimpse of the canyon from Artist Point. There is no other approach which brings the canyon so suddenly and favorably into view.

*Canyon to Tower Falls.*—Nearly all of the temporary bridges on this line should be replaced at an early date with pipe culverts of suitable size and by earthen embankments. In some cases these embankments should be supported on the lower side by timber cribs. This applies particularly to the bridges on the low line from Dunraven Pass north. These cribs, if filled with rock, will last twenty to thirty years.

There is one faulty location on this line which it may some day be worth while to change. From Dunraven Pass south about a mile and a quarter to the top of the ridge, where the climb from the Canyon Hotel terminates, the road should have been built on a practically level line. The surveyor who laid out the work was instructed to run a constant grade between the two points; but, becoming alarmed at the presence of a considerable swamp which lay in his route, he deliberately and without asking instructions ran the line above the swamp, thus introducing a rise and fall of about 70 feet in the line. The construction party was close behind and had opened up the whole line before the officer in charge visited the ground. The defect is, however, not very important. The difference of time in driving over the two locations would be trifling, possibly three or four minutes for passenger vehicles and practically nothing for freight outfits; but, nevertheless, the location is not what was intended and not what it ought to be.

*Tower Falls to Mammoth Hot Springs.*—No changes nor any special work are required on this line. It has been seriously contemplated to

drop the road down at the head of the East Gardiner Falls and carry it under the cliff where the dangerous slide rock occurs on the present location. This road was built about eight years ago and should have been located on the lower line at the time. The old location is now retained simply to avoid the abandonment of so much work. The substitute line would have been nearly a mile long, leaving the present road 1,000 feet or so above the East Gardiner Bridge, crossing the East Gardiner just at the head of the falls, following the line of the cliff and joining the present road where it would be intersected by a practically level grade from the falls. If the maintenance of the present road is found to be too difficult on account of landslides, the lower location may yet have to be adopted.

*Norris to Canyon.*—This is the least satisfactory road in the park. Its original location was miserably chosen and consists of long tangents over a rolling forested country where reasonable care might have found a far better route. The large amount of work that has been done upon it and the fixed termini, which can not well be changed, make it inadvisable to choose a different location now. The road is full of ups and downs, which give it a bad appearance, and there is an absolute dearth of good surfacing material over nearly the whole distance. Although the road bed lies on the native rock nearly all the way, the rock is of a character that disintegrates rapidly on exposure to the air and is worthless as a road material. Water for sprinkling has been hitherto considered as lacking, but a careful search of the ground in the woods on either side during the past season discovered a sufficient number of ponds, so that it is probable that water can be had to sprinkle nearly the entire distance.

A large amount of work has already been done toward remedying the defects of this location. The two Virginia Cascade hills have been cut out by a cliff road located in the solid rock. When this has been widened somewhat and provided with a good guard wall, the road there will be very satisfactory. The steep grade up Blanding Hill has also been replaced by an 8 per cent location, and the same has been done with the steep hill on the slope next to the Grand Canyon. A large number of the small hills and hollows on the road have been evened up, and the timber clearing has been widened 30 feet on the south side of the road, which advances the snow melting in the road by at least two weeks.

To further improve this road and produce the best practicable solution of a very difficult problem, the remaining hills and hollows should be graded out, the roadbed should be built up more deeply with the native material, so that there will be a heavier cushion over the underlying rock, and the entire road should be sprinkled, if possible, so as to hold the surface from disintegration in extremely dry weather. With these measures taken it is believed that the road can be kept in fair condition. The cost of transporting crushed rock or gravel from any available quarries is too great to be considered for the greater portion of the road.

*Southern approach.*—This approach has been considered as terminating at the mouth of Buffalo Fork of Snake River, where it connects with the Fort Washakie military road leading to Wind River and central Wyoming. It ought also to include a road from the foot of Jackson Lake, over Teton Pass, to the boundary of the forest reserve, in order to give access to the Snake River Basin in southeastern Idaho.

This is necessary to make the southern approach complete. The work can be done with sufficient thoroughness to meet all reasonable needs for about \$20,000 and should be provided for in a separate appropriation.

*Western approach.*—A short portion of the western end of this approach will have to be changed to meet the location of the prospective railroad terminus and the proposed hotel at Riverside, some four miles within the park. The route lies over a level plain covered with a fine timbered growth called Christmas Tree Park. While the ground would probably admit of a single tangent over the entire relocation, it is recommended that whoever lays out the road adopt a sinuous line, so as to shorten the view ahead and enhance the interest to travelers.

*Maintenance.*—The completion of the roads and the development of the sprinkling system have made possible the organization of a general scheme for keeping the roads in repair. The sprinklers cover about 5 miles of roadway each (only 4 miles between Mammoth Hot Springs and Norris). Two sprinklers start from a common camp and work each way, thus making the camps 8 to 10 miles apart. These camps should also be occupied by small repair crews of 8 to 10 men each, making in all 13 to 15 men in camp, including the cook. As soon as satisfactory locations for the sprinkler camps are determined as a result of experience, small permanent buildings should be erected for the storage of forage and supplies and for a kitchen and mess room. Forage should be stored in these buildings in the fall to avoid the necessity of hauling it in the spring, when the roads are soft with the melting snow and frost.

The number of men required for repair work in the early part of the season will be about one per mile on the main system and the northern and western approaches, and this number will be reduced somewhat later in the season. One-fourth the same proportion will do on the other roads.

The above organization will be similar to the section-gang system on railroads and will, it is believed, work successfully and keep the roads in as good condition as it is possible to keep them. This plan is already being followed to a large extent where sprinkling is now being done.

The sprinkling system serves three important purposes: Primarily, it removes the dust nuisance so far that it is not a serious annoyance. In the second place, it helps maintain the roads. No matter how thoroughly a road is built it will not stand a prolonged drought without more rapid deterioration than if it were sprinkled, and the less thorough the road work the more severe the effect of dry weather. Thirdly, the constant passing over the roads by the sprinkler outfits is a protection against forest fires, for these fires generally start in the vicinity of the roads, where they are sure to be observed very soon after their inception.

*Execution of work.*—With the complete organization and plant now available on this work no contractor can compete with the Government, and nearly every attempt to do so has resulted in failure. All work is, therefore, done by hired labor. The hire of teams is the only large feature of the work that is done by contract, and it is recommended that this be abandoned hereafter and that teams be hired in open market at a fixed schedule of prices. The chief difficulty relates to the

matter of forage, but that can be handled satisfactorily with reasonable care.

*Administration.*—If the work remains under the charge of the Engineer Department I strongly recommend making the park a separate district, with an officer permanently stationed here. The demand upon the officer's time during the season of active operations is excessive, and if he has large duties outside it necessarily cripples to some extent his supervision here. There is a fine office building here with quarters for an unmarried officer. The records and accounts of the work have been kept entirely distinct from those of the Sioux City office, and the transfer of the work independently of the river works will cause no confusion.

*New roads.*—It has been the policy of the officer in charge of the improvement work, and also of the present superintendent of the park, to discourage any material extension of the park road system. There are now roads enough. There are four excellent approaches, one on each side of the park, along routes fixed by nature in the valleys of important streams, and these will serve any probable future public needs. It is impossible that any important railroad system should build to the border of the park in a way that it could not be served better by the existing approaches than it could by any others that might be built.

The matter is an important one because there are already on foot two well-organized projects to secure additional approaches, and there will doubtless be others. The two referred to are being promoted by the people of Bozeman and Red Lodge, respectively. The people of Bozeman wish to have the Government build a road from the northwest corner of the park to the main circuit, 7 miles out from this place. The people of Red Lodge wish to have built a long road through the forest reserve from the vicinity of Red Lodge to Cooke City, at the northeast corner of the park. No portion of this route is within the park proper.

The objections to these projects are:

(1) The proposed roads are not needed by the general public and would serve it only to a very limited extent. The Northern Pacific Railroad, the only one that is likely for a long while in the future to serve these two communities, will never send its tourists to the park by these routes when it has the Gardiner approach, with every possible advantage over either. The roads, if built, would be of local importance mainly, and as such are not justified as public measures.

(2) Both roads pass over such high country that they could not be opened to travel on the average before July 1 and would be closed by snow soon after September 1, and would therefore be available for travel only about two months in the year.

(3) The cost of the roads would be very heavy. If figured at only \$2,000 per mile, it would be upward of \$50,000 for the Bozeman road, and for the Red Lodge road about \$80,000 and maintenance. The cost of building the present system of roads for the park has been very heavy, and the burden of maintaining it is large. It would be bad policy to increase that burden unless there is positive public necessity for it. It will be a great deal better to develop and perfect the present system of roads than to extend it unduly.

I trust that whenever these projects come up for action the Department will exercise with great care its authority under the act of June

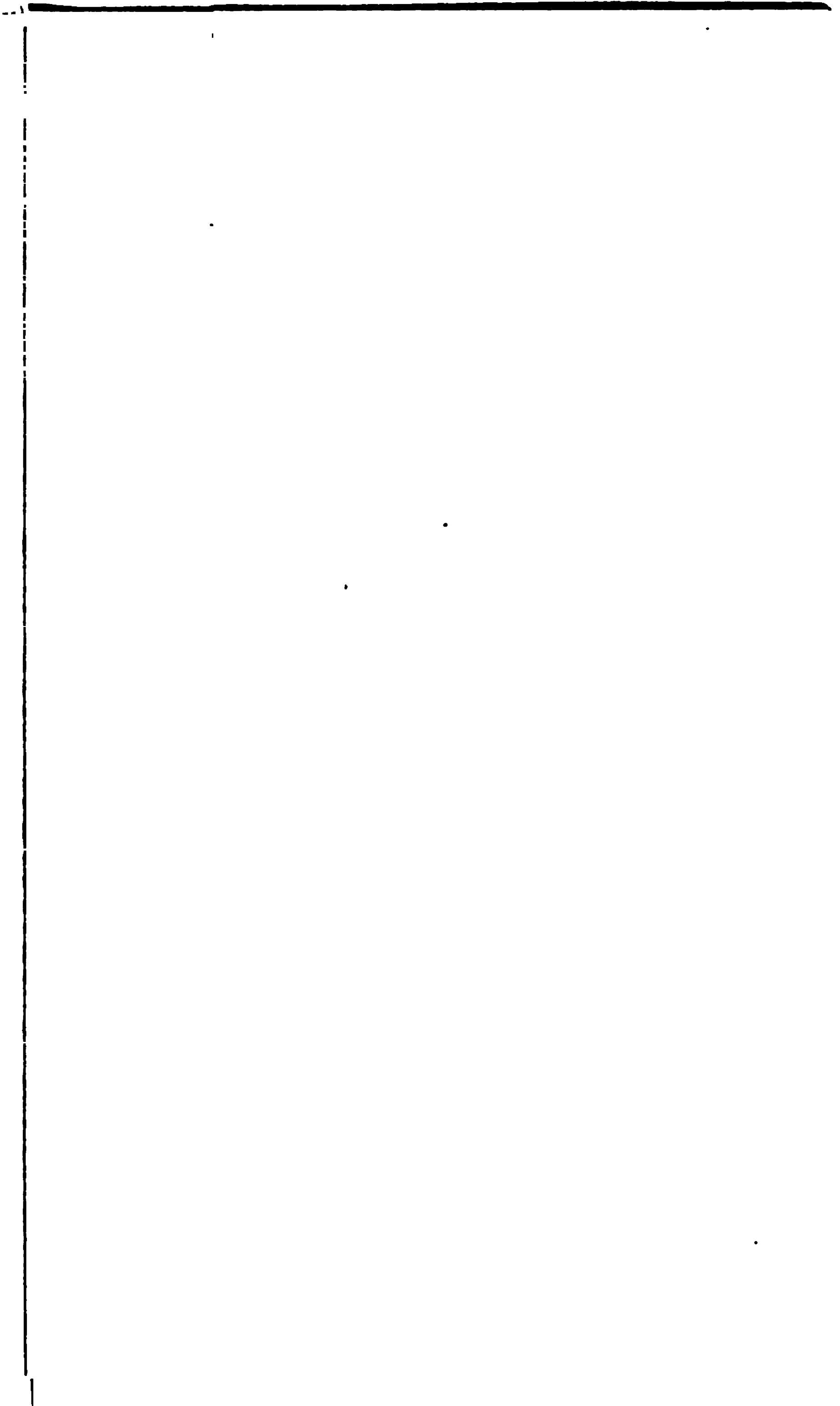
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6, 1900, viz, "That road extensions and improvements shall hereafter be made in said park under and in harmony with a general plan of roads and improvements to be approved by the Chief of Engineers of the Army."

Appropriations. <sup>a</sup>

Act.	Administra- tion and protection.	Roads and bridges.	Total.
March 3, 1883 .....	\$16,429.97	\$23,570.03	\$40,000.00
July 7, 1884 .....	16,999.98	23,000.02	40,000.00
March 3, 1885 .....	16,790.63	23,209.37	40,000.00
July 15, 1886 .....	934.25	.....	934.25
August 4, 1886 .....	.....	20,000.00	20,000.00
March 3, 1887 .....	.....	20,000.00	20,000.00
October 2, 1888 .....	.....	25,000.00	25,000.00
March 2, 1889 .....	.....	50,000.00	50,000.00
August 30, 1890 .....	.....	75,000.00	75,000.00
March 3, 1891 .....	.....	75,000.00	75,000.00
August 5, 1892 .....	.....	45,000.00	45,000.00
March 3, 1893 .....	.....	80,000.00	80,000.00
August 18, 1894 .....	.....	.....	30,000.00
March 2, 1895 .....	10,565.24	89,434.76	30,000.00
June 8, 1896 .....	.....	.....	5,000.00
June 11, 1896 .....	.....	.....	35,000.00
June 4, 1897 .....	6,736.74	28,263.26	35,000.00
July 7, 1898 .....	11,856.57	28,643.43	40,000.00
March 3, 1899 .....	5,534.64	34,465.36	40,000.00
June 6, 1900 .....	5,000.00	55,000.00	60,000.00
March 3, 1901 .....	5,000.00	113,000.00	118,000.00
June 28, 1902 .....	5,000.00	250,000.00	255,000.00
March 3, 1903 .....	5,000.00	250,000.00	255,000.00
April 28, 1904 .....	7,500.00	250,000.00	257,500.00
March 3, 1905 .....	7,500.00	133,000.00	140,500.00
Total .....	120,348.02	1,641,586.23	1,761,934.25

<sup>a</sup>The above table does not include appropriations made prior to the commencement of work under the Engineer Department. The amount of these early appropriations, which were made for the mixed purposes of road construction and administration, was \$68,425.17, making the total of all appropriations \$1,830,359.42.





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## APPENDIX G G G.

### ERECTION OF NEW BUILDING FOR GOVERNMENT PRINTING OFFICE AND REPAIRS AND RENT OF GOVERNMENT PRINTING OFFICE.

*REPORT OF CAPT. JOHN S. SEWELL, CORPS OF ENGINEERS, OFFICER  
IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905.*

### G G G.

#### ERECTION OF NEW BUILDING FOR GOVERNMENT PRINTING OFFICE.

U. S. ENGINEER OFFICE FOR ERECTION OF NEW  
BUILDING FOR GOVERNMENT PRINTING OFFICE,  
*Washington, D. C., July 12, 1905.*

GENERAL: I have the honor to submit the following report of operations on the new building for the Government Printing Office, being erected under the supervision of the Chief of Engineers, U. S. Army, for the fiscal year ending June 30, 1905.

For history of the project see Executive Documents: House Document No. 32, Fifty-sixth Congress, first session; House Document No. 25, Fifty-sixth Congress, second session; Senate Document No. 29, Fifty-seventh Congress, first session; Senate Document No. 9, Fifty-seventh Congress, second session; House Document No. 40, Fifty-eighth Congress, first session; also reports of the Chief of Engineers, as follows: Appendix H H H, Annual Report 1901, page 3801; Appendix H H H, Annual Report 1902, page 3065; Appendix I I I, Annual Report 1903, page 2919; Appendix G G G, Annual Report 1904, page 4179.

The work is now complete in all particulars, except for the delivery of one steam pump, which is under contract.

The balance of the appropriation has been deposited in the Treasury and, it is understood, will be carried into the surplus fund. While the balance turned in is nearly \$20,000, there is a liability for a verdict in favor of the Phoenix Iron Company for nearly \$15,000, so that the amount really saved in the construction of the building is in the neighborhood of \$5,000.

The condition of the appropriation is indicated in the table appended hereto:

Amount appropriated by act of March 3, 1899 .....	\$350,000.00
Amount appropriated by act of June 6, 1900 .....	775,000.00
Amount appropriated by act of March 3, 1901 .....	1,304,000.00
	<hr/>
	2,429,000.00
June 30, 1905, amount expended to date .....	2,409,128.67
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July 1, 1905, balance unexpended .....	\$19,873.33
July 1, 1905, outstanding liabilities .....	710.00
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July 1, 1905, balance of appropriation deposited in Treasury United States .....	19,163.33

Very respectfully,

JOHN STEPHEN SEWELL,  
*Captain, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

G G G 2.

REPAIRS AND RENT OF THE GOVERNMENT PRINTING OFFICE.

U. S. ENGINEER OFFICE FOR ERECTION OF  
NEW BUILDING FOR GOVERNMENT PRINTING OFFICE,  
*Washington, D. C., July 12, 1905.*

GENERAL: I have the honor to submit the following report of operations on repairs and rent of the old Government Printing Office building for the fiscal year ended June 30, 1905.

The appropriation under which this work was done is the balance of an old one, contained in the act of August 18, 1894, which provides as follows:

To enable the Chief of Engineers of the Army, under the direction of the Joint Committee on Printing, to repair the Government Printing Office, provide fire escapes, and put said building in a safe and secure condition, and to enable the Public Printer, under the direction of the Joint Committee on Printing, to rent, if necessary, any buildings for the use of the Printing Office, seventy-five thousand dollars.

The act of March 2, 1895, provides as follows:

The appropriation of seventy-five thousand dollars made by the sundry civil appropriation act, approved August eighteenth, eighteen hundred and ninety-four, for the repair of the Government Printing Office, to provide fire escapes, and to put the building in a safe and secure condition, shall be available until the completion of the work. At any time when there is no joint committee of the two Houses of Congress the powers and duties under the law devolving upon the Joint Committee on Printing shall be exercised and performed by the committee then in existence of either House.

During the fiscal year the following miscellaneous repairs have been attended to: New grilles on the first-story windows in lieu of the old and badly decayed wooden shutters; reconstruction of guttering and downspouts on parts of the old building not covered with new roof and provided with new gutter during the fiscal year.

The balance of the appropriation has been turned into the Treasury, and, it is understood, will be carried to the surplus fund, so that no further operations are contemplated under this appropriation.

The condition of the appropriation is as follows:

Amount appropriated by act of August 18, 1894 .....	\$75,000.00
June 30, 1905, amount expended to date .....	62,527.69
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July 1, 1905, balance deposited in Treasury United States .....	12,472.31

Very respectfully,

JOHN STEPHEN SEWELL,  
*Captain, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

## APPENDIX H H H.

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OPERATIONS ON BUILDINGS, ARMY WAR COLLEGE, WASHINGTON,  
DISTRICT OF COLUMBIA, AND ENGINEER SCHOOL, WASHINGTON,  
DISTRICT OF COLUMBIA.

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REPORT OF CAPT. JOHN S. SEWELL, CORPS OF ENGINEERS, OFFICER  
IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905.

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UNITED STATES ENGINEER OFFICE FOR  
RECONSTRUCTION OF WASHINGTON BARRACKS,  
*Washington Barracks, Washington, D. C., July 12, 1905.*

GENERAL: I have the honor to submit the following report of operations upon the reconstruction of the Post of Washington Barracks, D. C., to adapt it to the uses of the Army War College and Engineer School of Application and Engineer Post, for the fiscal year ended June 30, 1905.

For a history of this enterprise see Appendix H H H, Annual Report of the Chief of Engineers, 1904.

The appropriations for the work were made as follows:

Act of June 30, 1902 (Public—No. 205):

\* \* \* \* \*

*Provided*, That the Secretary of War is hereby authorized to expend the sum of four hundred thousand dollars, or so much thereof as may be necessary, from the unexpended balance of the emergency fund appropriated in the act approved March third, eighteen hundred and ninety-nine, for the erection of the necessary buildings for the Army War College, established at Washington Barracks, District of Columbia, for the instruction of officers of the Army and militia of the United States.

\* \* \* \* \*

Same act:

That the Secretary of War is hereby authorized to expend the sum of five hundred thousand dollars, or so much thereof as may be necessary, from the unexpended balance of the appropriation for barracks and quarters for the fiscal year ending June thirtieth, nineteen hundred, which sum is hereby reappropriated for the construction of the necessary buildings for the Engineer School at Washington Barracks, District of Columbia.

Act approved March 2, 1903:

\* \* \* \* \*

Buildings, Engineer School, Washington, District of Columbia: For the completion of the establishment of the Engineer School and Post at Washington Barracks, District of Columbia, in accordance with plans submitted by the Chief of Engineers and approved by the Secretary of War, subject to such modifications as may prove to be expedient before or during construction, including buildings, roads, pavements, tree planting, grading, sea walls, sewerage, provision for lighting and protection

against fire, and all purposes for the proper establishment of said Engineer School and Post not specifically mentioned herein, three hundred and sixty thousand dollars; this sum and all other funds heretofore appropriated for this purpose to be available until expended.

Act approved April 23, 1904:

\* \* \* \* \*

For the completion of the necessary buildings, including approaches, heating and lighting plant, for the Army War College, at Washington Barracks, District of Columbia, in accordance with plans of the architects, three hundred thousand dollars: *Provided*, That no part of this appropriation shall be used until it shall have been determined, by the Secretary of War, that the entire cost of finishing the buildings, providing the approaches, heating and lighting plant, shall not exceed the appropriation herein made.

Act approved March 2, 1905.

\* \* \* \* \*

Engineer School, Washington, District of Columbia: \* \* \* *Provided further*, To cover extra expense in the establishment of the Engineer School and post at Washington Barracks, District of Columbia, due to difficult foundations, increased cost of labor, and other unforeseen and adverse contingencies, one hundred and fifty thousand dollars, to be immediately available.

#### PROGRESS OF WORK AT THE ENGINEER SCHOOL.

During the fiscal year the following buildings at the Engineer School have been completed and occupied: Thirteen sets of officers' quarters, the officers' mess, one barrack building for two companies, one band barrack, two mess hall buildings, one quartermaster and commissary storehouse, one new stable, and one new wagon shed.

Construction has been in progress on the following buildings: So much of a second two-company barrack building as is not interfered with by the Army General Hospital, six sets of noncommissioned officers' quarters, an engineer storehouse, a quartermaster workshop, a post bakery, foundations for bachelor officers' quarters, and two additional sets of officers' quarters.

The two sets of officers' quarters have been completed so far as to get them covered in. They will be entirely completed by fall. The quartermaster workshop and the post bakery are almost completed and will be ready for occupancy probably by September 1, 1905. The same is true of the portion of the second two-company barrack building under construction. The floor framing for the first floor of the engineer storehouse has been completed, and the brick walls are well advanced above the first-story level. The brickwork for four sets of noncommissioned officers' quarters has been brought to the point where it is to receive the first-floor framing, and this framing has been placed. The brickwork on the other two sets of noncommissioned officers' quarters is up to the finished ground level, but has not been carried any higher. Foundations for the bachelor officers' quarters have been completed, but nothing else has been done. The bachelor officers' quarters occupy a site on the east side of the post near the James Creek Canal. Immediately opposite this site, when the filling was in progress two years ago, the sea wall bounding the canal slid out into the canal under the pressure of the superincumbent earth. The trouble seems to be that the soil consists of a soft muck to a very great depth. Whenever any additional weight is piled on it, it settles and causes a lateral moving of the soft underlying material out under the canal, with a consequent bulging up in the bottom of

the canal. This action has caused several serious cracks to appear in the foundations of the bachelor officers' quarters before any appreciable weight was put on them. Because of this condition operations have been suspended on this building. It is only a question of time when either James Creek Canal will have to be abandoned and filled up, or else when the sea wall on its west side will have to be rebuilt with an adequate foundation. In either case the movement in the material surrounding the bachelor officers' quarters would be stopped, and it would then be possible to proceed with the building without inordinate expense. At the present time to make its foundations secure without regard to a sea wall or the filling of the canal would cost more than the importance of the building justifies. For this reason, as before stated, operations have been suspended, and it is probable they will not be resumed until such time as the reconstruction of the sea wall or the filling of the canal will correct the troublesome conditions. In the meantime should a considerable number of bachelor officers be ordered to Washington Barracks for duty a number of the old buildings are still available for quarters.

As stated in the last annual report, it would not be possible with existing appropriations to complete the entire reconstruction of the post as laid out. As stated in that report, this general layout is more comprehensive than anything that was ever estimated for, and it provides for the removal of all buildings, a thing which was not provided for in any estimate of cost. A study of the problem, after appropriations were made, indicated however, that in order to secure the maximum economy in future development it was quite necessary to adopt such a layout, even though it should be left in a manifestly incomplete condition for a number of years. The old buildings are all in an advanced stage of deterioration, and it will not be long before they will have to be pulled down anyway. All the work that has been done during the process of reconstruction has been made to accord with a plan which will provide for the most efficient possible future development of the post. Considering the great advance in the price of labor and materials which has occurred during the continuance of the work, at least as great a return in the way of new buildings has been obtained for the money expended as was ever contemplated in any estimate of cost. Emphasis is laid upon this fact at this time merely to prevent a wrong impression from being made by the incomplete appearance of the work. This was a condition which was deliberately accepted in order to avoid embarrassing conditions in the future.

#### PROGRESS OF WORK AT THE WAR COLLEGE BUILDING.

The terrace of the War College building has been about 80 per cent completed. The building itself is almost up to the level of the second floor. It would have been in a much more advanced stage of completion but for the fact that the act appropriating an additional \$300,000 required that the Secretary of War should be satisfied that the building could be completed within the limit of the appropriation before going ahead. This entailed quite a delay while preliminary but reasonably accurate estimates of cost could be obtained on all those parts of the work which could not be settled until it was known whether an additional appropriation would be granted or not.

The original plans, which were provisionally approved, also showed a good deal of ornamental interior finish, most of which has had to be cut out in the interest of economy. The architects were very loth to do this, and it has required a good deal of time to find something which would be reasonably satisfactory to them and yet come within the limit of the appropriation. For these reasons the building is not quite so far advanced as it was hoped, but there is every reason to suppose that it will be ready for occupancy during the late spring of 1906.

Some interesting developments in the way of concrete pile work and reenforced concrete work have resulted from the year's work on the War College and Engineer School, but the data are not sufficiently complete to justify a contribution at this time to the technical appendix of the report of the Chief of Engineers. This matter will be reserved until next year, when it can be stated accurately and in a way to be of value to those who are interested in it.

The present condition of appropriations for the War College building is as follows:

Amount appropriated by act of June 30, 1902 .....	\$400,000.00
Amount appropriated by act of April 23, 1904 .....	300,000.00
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	700,000.00
June 30, 1905, amount expended to date .....	234,130.43
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July 1, 1905, balance unexpended .....	465,869.57
July 1, 1905, outstanding liabilities .....	\$9,455.08
July 1, 1905, covered by existing contracts .....	216,036.20
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	225,491.28
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July 1, balance available .....	240,378.29

The present condition of appropriations for buildings, Engineer School, Washington Barracks, is as follows:

Amount appropriated by act of June 30, 1902 .....	\$500,000.00
Amount appropriated by act of March 2, 1903 .....	360,000.00
Amount appropriated by act of March 2, 1905 .....	150,000.00
	<hr/>
	1,010,000.00
June 30, 1905, amount expended to date .....	879,316.42
	<hr/>
July 1, 1905, balance unexpended .....	130,683.58
July 1, 1905, outstanding liabilities .....	\$6,876.20
July 1, 1905, covered by existing contracts .....	36,785.82
	<hr/>
	43,662.02
	<hr/>
July 1, 1905, balance available .....	87,021.56

The following is a list of all contracts which have been let from the beginning of the work to the present time:



## BUILDINGS, ARMY WAR COLLEGE, WASHINGTON, D. C.

List of all contracts let from beginning of work to present time.

Date	Name of contractor.	Subject of contract	Price	Actual or estimated cost.	Present condition.
1902.					
Aug. 18	McKim, Mead & White	Architectural services.		\$24,500.00	In force.
Oct. 1	Wm. J. Baldwin	Designing heating plant		2,500.00	Do.
Nov. 22	Washington Brick and Terra Cotta Co.	Common brick	\$7.97 per thousand.	4,011.30	Completed.
Dec. 30	The Norcross Bros. Co.	Granite base	Molded, \$15.90 per linear foot; plain, \$7.45 per linear foot.	13,880.01	Do.
1903.					
May 27	S. Dana Lincoln	Portland cement	\$1.39 per barrel	8,606.58	Do.
May 27	Atlas Portland Cement Co.	do	\$1.97 per barrel	679.65	Do.
28	Columbia National Sand Dredging Co.	Sand and gravel	\$1.25 per cubic yard for building sand, concrete sand, and gravel.	10,688.67	In force.
Sept. 21	do	Gravel	\$1.40 per cubic yard	3,000.00	Do.
Oct. 10	S. Dana Lincoln	Portland cement	\$1.65 per barrel	1,354.24	Completed.
17	Standard Brick Co.	Hard-burned common brick	\$9.48 per thousand	3,277.86	Do.
17	W. H. Tapley	Designing electrical installation.		500.00	In force.
1904.					
Feb. 20	Potomac Brick Co.	Arch bricks	\$10.50 per thousand	3,159.18	Completed.
Apr. 25	The J. L. Mott Iron Works	Plumbing fixtures		2,938.69	Do.
May 5	New Jersey Foundry and Machine Co.	Cast-iron trench covers	36-inch trench, 39 cents per square foot; 12-inch trench, 1.24.78 cents with nuts.	1,260.00	In force.
12	Potomac Brick Co.	Dark red bricks		368.48	Completed.
25	S. Dana Lincoln	Portland cement		525.41	Do.
June 25	M. J. McGrath	Fire of teams		410.25	Do.
July 2	W. J. Zeb Co.	Coal	Creek, \$3.90	101.40	Do.
9	do	do		42.15	Do.
23	do	Paving brick.		180.00	In force.
Aug. 2	do	Limestone		98,492.51	Do.
4	do	Filling		3,433.33	Completed.
11	Norcross Bros. Co.	Granite		11,919.00	Do.
21	F. S. Gichner	Grilles		1,134.00	Do.
Oct. 27	Charles Warner Co.	Portland cement	\$1.14 per barrel	8,400.00	In force.
Dec. 2	S. Dana Lincoln	La Farge cement	\$8.20 per barrel	640.00	Do.
23	Carnegie Steel Co.	Steel bars		200.00	Completed.



List of all contracts let from beginning of work to present time—Continued.

Date.	Name of contractor.	Subject of contract.	Price.	Actual or estimated cost.	Present condition.
1906. Jan. 5	Trussed Concrete Steel Co.....	Kahn bars.....	3 cents per pound .....	\$9,600.00	In force.
Feb. 16	Wm. A. Mills .....	Red paving brick .....	\$21.50 per thousand .....	587.50	Do.
Mar. 21	James L. Parsons .....	Derrick, etc.....	.....	1,000.00	Do.
25	Orrin D. Person .....	Buff brick .....	\$27 per thousand .....	8,875.00	Do.
27	Richardson & Burgess.....	Stiff-leg derricks .....	.....	6,000.00	Do.
Apr. 7	Hugh Reilly .....	Glass and glazing.....	.....	1,949.00	Do.
12	New Jersey Foundry and Machine Co .....	Cast-iron frames.....	.....	16,285.00	Do.
14	Thos. W. Smith .....	Wooden window frames, etc .....	.....	1,733.90	Do.
27	R. Guastavino Co.....	Timbrel arch construction .....	.....	84,384.95	Do.
May 23	Cranford Paving Co.....	Concrete piles .....	18 inches long, \$260 per thousand; 12 inches long, \$175 per thousand; 9 inches long, \$130 per thousand.	2,500.00	Do.
25	National Fireproofing Co.....	Porous terra-cotta tiles .....	.....	4,760.00	Do.
26	Washington Brick and Terra Cotta Co .....	Common brick .....	\$8.42 per thousand .....	10,946.00	Do.
(a)	Brick, Terra Cotta, and Tile Co.....	Ornamental terra cotta.....	.....	8,300.00	Do.
	Total amount of contracts made .....	.....	.....	800,705.04	

a Contract papers in process of execution.

BUILDINGS, ENGINEER SCHOOL, WASHINGTON, D. C.

List of all contracts from beginning of work to present time.

Date.	Name of contractor.	Subject of contract.	Price	Actual or estimated cost.	Present condition.
1902.					
Aug. 13	McKim, Mead & White	Architectural services.		\$24,500.00	In force.
Oct. 21	Wm. J. Baldwin	Designing heating plant.		2,500.00	Do.
Nov. 22	Washington Brick and Terra Cotta Co.	Common brick.	\$7.97 per thousand.	45,127.14	Completed.
1903.					
Jan. 16		Driving holes for concrete piles.		6,646.44	Completed.
Mar. 5		Electric current.	6 cents per 1,000 watt hours.		In force.
Mar. 6	Telephone Co.	Telephone service.	\$180 per annum.		Do.
May 6		Pipe, etc.		1,625.00	Completed.
May 20		Concrete pile points.		2,031.41	Do.
May 27		Portland cement.		8,406.78	Do.
May 27		Natural cement.		890.01	Do.
May 27		Portland cement.		7,200.36	Do.
May 28		Sand and gravel.		7,816.33	In force.
June 29	Dredging Co.	Lumber.	at M feet B. M., Georgia at B. M.	9,076.91	Completed.
July 30	Monumental Co.	Stone sills, etc.		5,511.41	Do.
Sept. 3		Door frames, etc.		9,961.56	Do.
Sept. 11		Georgia pine lumber.	\$24.25 per M feet B. M.	2,659.88	Do.
Sept. 19		Lime.	53 cents per barrel.	400.00	In force.
Sept. 19		Door and window frames.		12,462.85	Completed.
Sept. 19		Cut stone.		11,472.59	In force.
Sept. 21		Concrete fireproofing.		35,000.00	Do.
Sept. 21			9 cents per square foot.	904.24	Completed.
Sept. 21			\$1.40 per cubic yard.	3,800.00	In force.
Sept. 23	Dredging Co.			1,478.12	Do.
Oct. 6		Portland cement.	\$1.66 per barrel.	2,746.42	Completed.
Oct. 10		Pipe and fittings.		3,595.76	Do.
Oct. 13		Designing electric installation.		698.39	Do.
Oct. 17		Lumber.	Virginia pine sheathing, \$17.70 per M feet B. M., flooring, \$17.70 per M feet	500.00	In force.
Oct. 17				3,115.56	Completed.
Dec. 16	Hartmann Bros. Manufacturing Co.	Exterior columns, etc.	per M feet B. M.	8,970.78	Do.
Dec. 23	W. T. Galliher & Bro.	Lumber.	sides, \$27.50 per M feet 50 feet, and 6 by 12 inches @ \$55 per M feet B. M.	1,109.15	Do.
18	Meade Roofing and Cornice Co.	Slate roofing, etc.		21,628.34	In force.

List of all contracts from beginning of work to present time—Continued.

Date.	Name of contractor.	Subject of contract.	Price.	Actual or estimated cost.	Present condition.
1904.					
Jan. 14	Thos. W. Smith	Exterior finish		\$8,346.90	Completed.
80	Blake & Williams	Underground steam conduits		8,708.00	Do.
Feb. 2	The E. Keeler Co.	Boilers		11,358.00	Do.
20	Vaux & Co.	Radiators, valves, etc.		11,480.00	In force.
25	Meade Roofing and Cornice Co.	Supplementary to contract of Dec. 18, 1903.		300.00	Do.
Mar. 11	The Biggs Heating Co.	Steam-heating apparatus		10,177.41	Do.
Apr. 6	The Cranford Paving Co.	Concrete piles in place		2,194.04	Completed.
16	Carter & Clarke	White-oak piles and pile driving	16-inch piles, at 16 cents per linear foot; 14-inch piles, at 15 cents per linear foot; 12-inch piles, at 14 cents per linear foot; 10-inch piles, at 14 cents per linear foot. Pile driver, at \$9.99 per day.	1,187.56	Do.
20	Thos. W. Smith	Georgia pine lumber	\$24.70 per M feet B. M.	1,947.37	Do.
25	The J. L. Mott Iron Works	Plumbing fixtures		19,920.61	Do.
26	A. Malnati	Cut stone		2,250.00	Do.
28	W. T. Gallher & Bro.	Georgia pine lumber		1,486.32	Do.
28	Wm. D. Gill & Sons	do		5,039.19	Do.
May 14	The Cranford Paving Co.	Concrete piles		3,616.28	In force.
17	Thos. R. Riley	Spruce laths	\$3.65 per thousand	1,241.00	Completed.
25	S. Dana Lincoln	Portland cement	\$1.27 per barrel	8,129.28	Do.
25	Barber & Ross	Interior finish		3,007.73	Do.
27	S. Dana Lincoln	(Plaster of Paris	\$1.49 per barrel		
		Hair	18 cents per bushel	1,789.10	In force.
28	do	Limoid	\$7 per ton of 2,000 pounds	4,045.53	Completed.
		Supplementary to contract of May 27, 1903, substituting Portland cement for natural.			
31	Thos. R. Riley	(Georgia pine flooring	\$42.75 per M feet B. M.	3,513.15	In force.
June 7	Martin Wiegand	(Georgia pine rough scantling	\$25 per M feet B. M.	1,045.84	Completed.
7	do	Interior finish		1,770.68	Do.
23	Washington Granite and Monumental Co.	Millwork		1,021.51	Do.
23	The Biggs Heating Co.	Cut stone		1,259.65	Do.
25	M. J. McGrath	Heating apparatus		4,293.25	Do.
July 2	W. J. Zeh Co.	Hire of teams	\$2 per day	543.50	Do.
9	C. C. Smithson	Coal	White-ash egg, \$6.40 per ton; Georges Creek, \$3.90.	81.14	Do.
23	Frederick Brick Works	do	White-ash stove, \$6.49 per ton	300.00	Do.
27	Thos. R. Riley	Paving brick	\$12 per thousand	812.47	In force.
Aug. 8	Yale & Towne Manufacturing Co.	Sheathing		1,241.56	Completed.
30	Joseph L. Crupper	Hardware		2,973.52	Do.
		Maple flooring	First grade, \$36.80 per M feet B. M.; second grade, \$30.45 per M feet B. M.		

30	Thos. W. Smith	Mantels	825.90	Do.
30	do	Interior trimmings	494.26	Do.
Sept. 14	Yale & Towne Manufacturing Co.	Hardware	8,637.61	Do.
29	A. F. Jones	Panels, etc.	1,574.50	In force.
Oct. 3	Wm. D. Gill & Sons	Lumber	1,759.02	Completed.
8	The Enos Co.	Electric and gas fixtures	8,127.40	Do.
11	Thos. W. Smith	Interior trimmings	1,006.77	Do.
25	Meade Roofing and Cornice Co.	Roofing, etc.	2,337.41	Do.
27	Charles Warner Co.	Portland cement	8,000.00	In force.
Nov. 9	Fred S. Gichner	Panels and stair work	1,734.00	Do.
28	Thos. R. Riley	Lumber	1,570.18	Completed.
Dec. 16	The Enos Co.	Gas and electric fixtures	1,299.10	In force.
27	H. Borgmann Manufacturing Co.	Partitions, etc.	1,071.00	Completed.
1905.				
Jan. 27		Fences	332.06	Completed.
Feb. 17		Heating apparatus	2,733.62	Do.
Mar. 27		Lumber	1,236.52	Do.
Apr. 10		Asphalt floors	1,514.06	Do.
21		Lumber	1,900.00	In force.
25		Cut stone	2,063.52	Do.
May 16	edging Co	Sand and gravel		Do.
18		Millwork	1,398.76	Do.
19		Glass and glazing	207.38	Do.
20		Post caps, etc.	1,422.00	Do.
20	Cotis Co	Common brick	6,694.00	Do.
20	Co.	Frames	1,968.92	Do.
(a)		Roofing, etc.	3,500.00	Do.
(a)			414,316.56	
	Total amount of contracts made			

<sup>a</sup> Contract papers in process of execution.

Very respectfully,  
Brig. Gen. A. Mackenzie,  
Chief of Engineers, U. S. A.

John Stephen Sewell,  
Captain, Corps of Engineers.



**APPENDIX I I I.**

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**ERECTION OF THE STATUE OF FREDERICK THE GREAT AT THE ARMY  
WAR COLLEGE.**

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**UNITED STATES ENGINEER OFFICE FOR  
RECONSTRUCTION OF WASHINGTON BARRACKS,  
*Washington Barracks, Washington, D. C., July 12, 1905.***

**GENERAL:** I have the honor to submit the following report of operations on the erection of the statue of Frederick the Great at the Army War College, Washington Barracks, D. C., for the fiscal year ended June 30, 1905. The work was authorized by the sundry civil act approved April 28, 1904:

\* \* \* \* \*

To defray the expenses incident to the erection and dedication, upon War College grounds, Washington Barracks, of the statue of Frederick the Great, the gift to the United States of His Imperial Majesty, the Emperor of Germany, to be immediately available, eight thousand dollars.

The pedestal was purchased and placed in position, the statue placed thereon, and the unveiling ceremonies occurred on November 19, 1904.

The pedestal stands on the line of front steps leading up to the terrace in front of the War College. It occupies one of six granite bases provided for similar purposes.

All the work in connection with the statue proper has been completed except that an inscription stating the date of dedication remains to be placed on the south side of the base of the pedestal. When this work is completed, as it will be in the near future, the balance of the appropriation will be turned into the Treasury.

The condition of the appropriation is as follows:

Amount appropriated by act of April 28, 1904.....	\$8,000.00
June 30, 1905, amount expended to date .....	7,166.74
July 1, 1905, balance unexpended .....	833.26
July 1, 1905, outstanding liabilities .....	250.00
July 1, 1905, balance available .....	583.26

Very respectfully,

**JOHN STEPHEN SEWELL,**  
*Captain, Corps of Engineers.*

**Brig. Gen. A. MACKENZIE,**  
*Chief of Engineers, U. S. A.*





## APPENDIX J J J.

### ERECTION OF MONUMENTS TO GENERALS FRANCIS NASH AND WILLIAM LEE DAVIDSON, OF NORTH CAROLINA.

REPORT OF CAPT. R. P. JOHNSTON, CORPS OF ENGINEERS, OFFICER  
IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1905.

(For letter of transmittal see Appendix M.)

References: See page 750 of current summary.

On November 2, 1904, final designs for the two monuments were approved by the Chief of Engineers, U. S. Army, and on November 12, 1904, advertisement for proposals for erection, to be opened December 12, 1904, were issued. The lowest received in response thereto was that of James F. Nowlan, of Greensboro, N. C., whose bid of \$8,750 was accepted, and contract for both monuments was approved by the Chief of Engineers, U. S. Army, on January 18, 1905, and contractor was notified on January 23, 1905, of the approval of his contract.

Work of erection was begun March 23, 1905.

Finding it impossible to complete the work within the time specified in the contract, the contractor asked an extension of time, which was granted, with the approval of the Chief of Engineers.

Four bronze inscription tablets (two for each monument) were purchased under written notice from the Henry Bonnard Bronze Company, of New York, at a cost of \$500 for the four.

At the close of the fiscal year one monument, that to General Davidson, had been practically completed; most of the stone for the Nash monument had been delivered and the work of erection had just been begun.

#### *Money statements.*

##### MONUMENT TO GENERAL NASH.

July 1, 1904, balance unexpended .....	\$4, 951. 04
June 30, 1905, amount expended during fiscal year, for works of improvement .....	432. 55
July 1, 1905, balance unexpended .....	4, 518. 49
July 1, 1905, outstanding liabilities .....	58. 25
July 1, 1905, balance available .....	4, 460. 24
July 1, 1905, amount covered by uncompleted contracts.....	4, 375. 00

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MONUMENT TO GENERAL DAVIDSON.

July 1, 1904, balance unexpended .....	\$4,951.03
June 30, 1905, amount expended during fiscal year, for works of improve- ment .....	432.53
July 1, 1905, balance unexpended .....	4,518.50
July 1, 1905, outstanding liabilities .....	58.25
July 1, 1905, balance available .....	4,460.25
July 1, 1905, amount covered by uncompleted contracts.....	4,375.00

ABSTRACT OF CONTRACT.

Contractor, J. F. Nowlan, for erection of two monuments, at a total cost of \$8,750; dated January 3, 1905, approved January 18, 1905; work to commence March 4, 1905, and be completed April 23, 1905.  
Time limit waived and extension (to May 31, 1905) granted April 24, 1905.

## APPENDIX K K K.

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ROAD INTO MOUNT RAINIER NATIONAL PARK; SURVEY FOR WAGON ROAD FROM VALDES TO FORT EGBERT, ALASKA, AND SURVEY FOR MILITARY TRAIL BETWEEN YUKON RIVER AND COLDFOOT, ALASKA.

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K K K I.

ROAD INTO MOUNT RANIER NATIONAL PARK.

UNITED STATES ENGINEER OFFICE,  
*Seattle, Wash., July 15, 1905.*

GENERAL: I have the honor to forward herewith annual report on road into Mount Rainier National Park for the fiscal year ending June 30, 1905.

Very respectfully, your obedient servant,

JOHN MILLIS,  
*Major, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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The sundry civil act of April 28, 1904, provided as follows:

For continuing the construction of the wagon road into said park heretofore surveyed and commenced under the direction of the Secretary of War, thirty thousand dollars, of which sum six thousand dollars, or so much thereof as may be necessary, shall be used by the Secretary of War in surveying and estimating the cost of a wagon road along the most practicable route from the eastern boundary of the Mount Rainier Forest Reserve into said park.

The survey for the proposed road from the eastward into the park was made by Mr. John Zug, junior engineer, and report and estimate were submitted January 16, 1905. This report was printed in House Document No. 283, Fifty-eighth Congress, third session.

For constructing the road from the westward contract was entered into with A. D. Miller after due advertisement. Work commenced in August, 1904, and was continued till November 17, 1904, when it had to be suspended on account of rain and snow. Clearing, grubbing, and grading were completed for about a mile from Longmire Springs. Work was not resumed in the spring owing to financial difficulties of the contractor. The contract time expired June 30, 1905, but an extension for a reasonable period was granted by the Chief of Engineers.

The work on the west side of the mountains was in local charge of Mr. Eugene Ricksecker, assistant engineer. His annual report, with a few omissions, is as follows:

The condition of work on July 1, 1904, was as follows:

It had been decided that "the best results would be secured by a road that in connection with existing means of communication would afford access to the mountain from Tacoma, the nearest large city, via Longmire Springs, Christine Falls, Nisqually glacier, Gap point, and Narada Falls, to Paradise Valley and the Camp of the Clouds," from whence the slopes to the summit of Mount Ranier can be readily climbed.

At each of the above points the tourist can profitably spend much time, though two of them are at present inaccessible except to sturdy climbers. Hotel accommodations can be had at the Springs and Camp of the Clouds. The present wagon road ends at the former, the trip to the latter being made by trail either on foot or horse.

The recent completion of the Tacoma Eastern Railway from Tacoma, along Kapowsin and Ohop lakes, through the Nisqually canyon, where that river is seemingly forced to turn edgewise in its mad rush for the ocean, to Elbe, and then on through a grand forest to Ashford, enables the tourist to reach Longmire Springs in seven hours (including one hour for luncheon), where formerly two and one-half days were required.

A survey and map had been made of the country in the vicinity of the trails from Longmire Springs up to Nisqually glacier and Camp of the Clouds. A paper location for the proposed road, about 15 miles long, had been laid out on the map to the latter point. Along this route a preliminary line had been run from the Springs to Gap point, about 6½ miles. The map also included about 1 mile of country along the road below the Springs. A draft of specifications for a completed section of road had been prepared. A party (No. 1) of seven men, in charge of Surveyman H. F. Wikner, placed in the field, June 23, 1904, was at work mapping the country in vicinity of present road from Longmire Springs down to the west boundary of the forest reserve.

*Work accomplished.*—Party No. 1 continued mapping until August 4, was then transferred to location work above Longmire Springs, and on November 17, returned to map work, completing it to the west boundary of the forest reserve on December 12, when it was disbanded. Besides the survey work, this party looked after road construction, giving the contractor the required lines and grades, until October 12, when Surveyman E. A. Tyler relieved Mr. Wikner of much of the details of this supervision.

On September 6 party No. 2, composed of Surveyman J. C. Baxter and five men, took the field and ran a preliminary line from the springs to the west boundary of the forest reserve and a location line on several sections to cut out the worst places on this portion of the route. The party disbanded on December 20.

On July 5 a repair crew (No. 1), consisting of foreman and five laborers, was set at work repairing the worst places in present road and trails to make them passable for the summer tourist travel. This party also roughed out a section of new trail, shortening the distance to Camp of the Clouds. The crew was discharge October 16.

Repair crew No. 2, foreman and three laborers, placed in the field August 6, did similar work, besides repairing several bridges. Crew discharged August 31.

Several men from these two crews also erected a rough building at the springs for office and storage use.

Both crews were attached to party No. 1 when working near each other, otherwise had independent camps. They reported to and were provisioned by Mr. Wikner.

Proposals for constructing portion of road above Longmire Springs were received by you on August 3 from advertisement dated July 20.

A. D. Miller, of Seattle, was found to be the lowest one of seven bidders, and award, approved by Chief of Engineers October 8, 1904, was made to him.

Mr. Miller began work on his contract August 26, 1904, and continued with a force of from 20 to 60 men per month until November 17, when the unfavorable weather conditions caused abandonment of work for the season.

*Details and results.*—Below the springs: Map work comprised 9 plane-table sheets, scale 200 feet to 1 inch, including one sheet partly finished, season 1903, and shows the topography (10-foot contours) from the springs to the west boundary of the forest reserve.

A paper location for road was laid out on these sheets after carefully studying the conditions. For scenic reasons attempt was made to generally follow the course of the Nisqually River on the high ground to Kautz Fork. It was necessary, however, to avoid the low and frequently flooded section between Kautz and Tahoma forks, but there being no way of reaching the high ground back of this area other than over a long stretch of swampy country, the attempt was abandoned in favor of the route around the base of the hills, where construction is easier and road material better.

The grades chosen were such as best seem to fit the country, ranging from 0.5 to 4 per cent, an average of 1.67 per cent.

A preliminary line, following the paper location generally, was run from the springs to the west boundary of the forest reserve, besides several short trial lines where appeared to be some question as to the best route. Several cut-offs were also investigated. The portions of route finally adopted vary but little from the paper location. The total distance, length of main line, is 10.53 miles, exclusive of about 1 mile of side lines.

With a view to early betterment of the worst portions of present road, a location line was run down from the springs for a distance of 2 miles; also around two high hills in the vicinity of the west boundary of the park.

Levels were run over all lines and cross sections made every 50 feet.

Above the springs: A location was carefully fitted to the ground from the station 0-00 at the springs to the station 58-00. Two things were kept in view, namely, to balance cuts and fills and to avoid rock in solid ledges as far as possible; also to construct a road comprising the most scenic features obtainable, and with as nearly a uniform grade as practicable, 4.3 per cent being the maximum.

These considerations taken in connection with the fact that the country was covered with dense growth of vegetation, through which it was impossible to get sights longer than a hundred feet without much labor in hewing out a line, tangents seldom longer than 100 feet, usually less than 50 feet; that, on account of fallen and dead timber and other vegetation, the transit was often many feet above the ground, and that, to obtain the cross section of the ground, it was necessary to first remove from 6 to 24 inches of vegetable matter at each point, a combination that made the question of determining the final position of the center line on work to be done by contract one of a series of approximations. There were many stretches of such dense growth that on a cloudy day it became necessary to use the light from candles to set points for the transit and read the level rod.

The paper location, season 1903, of the first 2,500 feet above the springs was purposely laid to avoid crossing the James Longmire mining claim. After securing more data it was found that by crossing this claim, passing close to the hotel and springs, through more open country, affording better views, the route would be materially improved. This change you approved and the road was so located.

A first location line was extended from station 58 to station 150, leveled and cross sectioned. The latter work shows that slight changes are necessary in the alignment to balance cuts and fills.

From station 150 a preliminary line was run on the west side of Van Trump Creek to station 226, where connection was made with preliminary line of last season at station 233, near Christine Falls, a gain in distance of 700 feet. There are several good reasons for a road along this route instead of on the east side; the scenic features and the probable earlier opening of it to travel by reason of its exposure, but the increased cost of construction due to rockwork and retaining walls will probably cause the adoption of some middle route. More data is required before the location of this section can be wisely determined.

From station 226 a preliminary line was run to crossing of Nisqually River, station 278, a few hundred feet from and in plain view of the foot of Nisqually glacier.

*Repairing road and trails.*—No road work of importance has been done on existing road to Longmire Springs within the park and reserve for several years for the reason that the act of Congress creating the park (approved March 2, 1899) took the control of it away from Pierce County, which formerly cared for it. As a consequence the road gradually deteriorated; the bridge timbers have rotted until it is a question whether it is safe to allow them to remain open to traffic. The demand and pressure for the improvement of this portion of the road last season was great. The demand during the coming season will, without doubt, be much more emphatic.

It was early realized that to place this road in good repair would cost more money than a new road properly built; much of it is low and subject to overflow from the Nisqually River, much of it passes over a forest floor several feet in thickness that with every rain quickly works up into muck, requiring a long while to dry out, and as Congress was expected to appropriate money to construct a good road it was decided to do as little repair work as the season's tourist travel would stand.

The work done consisted in rounding off some of the numerous sharp turns, removing trees and stumps that contracted the road dangerously (it is a single-track road and the traces and wheels of vehicles scrape the trees in many places), replacing muck at low, boggy places with volcanic ash, turning course of river at several places where its bed was higher than the road it frequently flooded, repairing corduroy, etc. Large dead trees frequently fell across the road and the force was several times called miles away from their work to remove same before a waiting stage could proceed.

A Howe truss bridge across the Tahoma Fork failed under a passing load of freight, from dry rot, and was repaired by placing several wooden, rock-filled cribs under the lower cords. One other bridge received similar repairs, and several bridges minor repairs.

Many more teams passed over the road than usual during the season.

*Trails.*—The bridle trail from Longmire Springs to Camp of the Clouds was repaired at the worst places, widening it where dangerously narrow by cutting trees and brush, removing boulders, or excavating material. A bridge was placed across the first ford of the Paradise River and the footbridge and ford at second crossing bettered. The Nisqually bridge and several small bridges were also repaired.

The bridle trail from Longmire Springs to Nisqually glacier had fallen into disuse, being off the main line of travel; then, too, it "petered out" when within a mile of the glacier, leaving the tourist to pick his way through brush and along the boulder-strewn bed of the river. This trail was opened up and extended to the glacier. A bridge across Van Trump Creek now takes the place of the ford.

*New trail.*—From the foot of Nisqually glacier a trail was roughed out to the top of the ridge, a short distance below Camp of the Clouds, and a temporary footbridge placed across the river. As the season was drawing to a close when this work was completed, it was thought best to defer placing a more permanent bridge here until next season on account of the likelihood of its being carried away on the occurrence of high water. This trail shortens the trip down to the springs from Camp of the Clouds some three-quarters of a mile and proved to be quite attractive, since its scenic features are entirely different from those on the main trail. The word "down" is used for the reason that the climb encountered on the main trail is here encompassed in a very short distance. The latter is pretty much of a steady climb, and requires from two and a half to three hours to make the trip one way. The former rises only 1,200 feet in the first  $3\frac{1}{2}$  miles, is then very steep for the next 1,500 feet, and then similar for the balance of the way (about 1 mile) to the same part of the route on the main trail. The down trip is easily made in one hour and three-quarters. When it is widened for use of horses, it will become very popular, particularly for the down trip.

*Office and storeroom building.*—This is a rough structure of rustic appearance, 20 by 21 feet, built at the springs and serves a very useful purpose as office for the engineering force and storeroom for tools and provisions. The outside is covered with hand-made cedar shakes, the inside dressed fir. It contains a large office room, two store-rooms, and an attic large enough to accommodate from four to six men.

*Soda spring.*—While digging for fresh water for camp use at a little distance from the Longmire Springs a soda spring of excellent taste was uncovered. A neat rustic spring house has been placed over it, bearing the letters "U. S. E. D." printed in old German.

*Road construction.*—The roadway as planned is to be cleared of all trees, stumps, brush, etc., cut level with the surrounding ground for a distance of 30 feet on each side of the center line of the proposed road. The rubbish is to be burned or removed beyond eyesight of the road.

The road is to be a first-class earth road, 16 feet wide, with a crown of 6 inches; level sections to have ditch on each side, whose bottom is not less than 12 inches deep below and 3 feet distant from edge of road; side-hill sections to have a 4-inch ditch on upper side, road increased  $2\frac{1}{2}$  feet in width on outer (fill) edge, and a bench 3 feet in width at toe of slope in cut. Fills to have a slope of 1 on  $1\frac{1}{2}$  and cuts 1 on 1. A catch-water ditch not less than 8 feet distant from upper edge of cut. Drainage to be carried under road in natural surface on ground through sewer pipe laid with tight joints. A surfacing of volcanic ash 4 inches thick at center, tapering to  $2\frac{1}{2}$  inches 7 feet from center, is to be rolled with a 10-ton roller. Earthwork includes all material of every class and nature, except such rock in ledges as can not be removed without blasting. Boulders and detached pieces of rock are included in price bid for earthwork, and when they appear or are known to exist within 9 inches of subgrade, must be removed. The surface of subgrade is to contain no stones larger than 2 inches in diameter.



The prices named by the lowest bidder, A. D. Miller, for this work were as follows:

Item.	Unit.	Approximate quantity. <sup>a</sup>	Price bid.	Item.	Unit.	Approximate quantity. <sup>a</sup>	Price bid.
Clearing .....	Acres .....	32	\$48.00	Cross drains and culverts—Continued.			
Grubbing .....	do .....	14	98.00	14-inch sewer pipe .....	Linear feet.	100	\$2.50
Earthwork .....	Cubic yards	30,000	.25	20-inch sewer pipe .....	do .....	100	3.00
Rockwork .....	do .....	300	3.00	24-inch sewer pipe .....	do .....	100	3.50
Retaining walls .....	do .....	220	3.50	Corduroy .....	do .....	200	.50
Under drains:				Culverts and bridges:			
4-inch tile .....	Linear feet.	50	.10	Hewed timber.	Feet B. M...	50,000	20.00
5-inch tile .....	do .....	50	.12	Sawed lumber.	do .....	50,000	30.00
6-inch tile .....	do .....	50	.14	Wrought iron .....	Pounds .....	100	.10
8-inch tile .....	do .....	50	.20	Surfacing .....	Square yards	43,000	.20
Trench work .....	Cubic yards	100	.25				
Catch-water ditches .....	do .....	2,000	.25				
Cross drains and culverts:							
10-inch sewer pipe .....	Linear feet.	100	2.00				
12-inch sewer pipe .....	do .....	100	2.25				

<sup>a</sup> In about 4½ miles of road.

The work accomplished at close of season was, approximately, as follows:

Clearing:		
Felling .....	linear feet..	8,400
Burning .....	do .....	6,200
Grubbing (incomplete) .....	do .....	5,900

Earthwork,<sup>a</sup> 5,400 linear feet—10,260 yards in cut, 9,420 yards in fill.

Rockwork, 617 cubic yards.

The road is roughed out, ready for use, and nearly completed (except as above), for a distance of 1 mile. The quantities and approximate cost to the contractor for mile No 1 are as follows:

Item.	Unit.	Quantity.	Approximate cost.	Item.	Unit.	Quantity.	Approximate cost.
Clearing .....	Acres .....	7.7	\$146.00	Earthwork .....	Cubic yards	9,830	\$0.2945
Grubbing .....	do .....	4.6	376.00	Rockwork .....	do .....	(17)	2.20

The cost of mile No. 1 to the Government will be about \$5,130, exclusive of engineering and superintendence, and to the contractor, about \$7,000.

\* \* \* \* \*

The season was a remarkably open one and quite warm. Very little rain fell and few days were lost on account of bad weather. The first snow fell September 22, disappearing almost immediately, and it was not until the middle of November that the weather conditions were at all unfavorable.

The number of people who visited the park during the season is said to be very much larger than during any previous season.

<sup>a</sup> Incomplete; lacks trimming, shaping, side-ditch work, and rolling.



The following table of distances, elevations, etc., from data obtained on surveys of last two seasons is more reliable than anything heretofore collated:

	Eleva- tions above mean tide.	Distance from west boundary forest reserve.	Distance from Tacoma.
	<i>Fect.</i>	<i>Miles.</i>	
Tacoma:	<sup>a</sup> 1,763	.....	By railroad, 55.3 miles. <sup>a</sup>
Ashford (terminus Tacoma Eastern R. R.)....	1,880	.....	By wagon road, 58.2 miles.
West boundary reserve and old road.....	1,837	0.6	By wagon road.
Allen's .....	1,895	2.3	Do.
Mesler's .....	1,925	2.8	Do.
Uhly's .....	1,985	3.5	Do.
Eastwood Lodge .....	2,090	4.8	Do.
Tahoma Fork .....	2,334	7.3	Do.
Kautz Fork.....	2,747	10.5	End of old wagon road.
Longmire Springs (U. S. Engineer office) .....	2,970	11.5	
End new road .....	2,930	11.2	By trail.
Junction trails to Camp Clouds .....			
Via Paradise Valley trail:			
Nisqually River Crossing.....	3,160	12.2	Do.
Carter Falls .....	3,650	13.2	Do.
First crossing Paradise River.....	3,850	13.7	Do.
Narada Falls .....	4,500	14.6	Do.
Second crossing Paradise River .....	4,600	14.7	Do.
Madcap Falls.....	4,800	15.1	Do.
Paradise Valley (upper) .....	5,000	15.2	Do.
Camp of the Clouds (Reese's Hotel).....	5,550	16.0	Do.
Via Nisqually Glacier trail:			
Van Trump Creek.....	3,430	12.9	Do.
Christine Falls (no trail).....	3,700	13.9	1 mile up Van Trump Creek.
Nisqually Glacier (river crossing).....	3,900	14.0	By trail.
Foot of glacier (approximated) .....	3,950	14.1	Do.
Top basalt ridge.....	4,800	14.3	Do.
	Highest.		
Camp of the Clouds (Reese's Hotel).....	5,550	15.2	} Across open country. Dis- tance estimated.
Summit Mount Rainier (no trail) .....	<sup>b</sup> 14,526	21.2	

<sup>a</sup> Authority Tacoma Eastern Railroad Company.  
<sup>b</sup> Authority United States Geological Survey.

No work has been done by the contractor since last fall owing to his failure to secure money with which to carry on a losing contract.

Money statement.

July 1, 1904, balance unexpended .....	\$34,884.31
June 30, 1905, amount expended during fiscal year .....	13,704.70
July 1, 1905, balance unexpended .....	21,179.61
July 1, 1905, outstanding liabilities .....	21,179.61

CONTRACT IN FORCE DURING FISCAL YEAR.

Contractor: A. D. Miller.  
Date of contract: September 13, 1904.  
Date of approval: October 8, 1904.  
Date of completion: June 30, 1905.  
Time for completion extended.

K K K 2.

SURVEY FOR WAGON ROAD FROM VALDES TO FORT EGBERT, ALASKA, 1904 AND 1905, AND SURVEY FOR MILITARY TRAIL BETWEEN YUKON RIVER AND COLDFOOT, ALASKA, 1904 AND 1905.

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UNITED STATES ENGINEER OFFICE,  
*Seattle, Wash., August 9, 1905.*

GENERAL: I have the honor to forward herewith annual reports on survey for wagon road from Valdes to Fort Egbert, Alaska, and survey for military trail between Yukon River and Coldfoot, Alaska, for the fiscal year ending June 30, 1905.

Very respectfully, your obedient servant,

JOHN MILLIS,  
*Major, Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

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The above surveys were provided for in the army appropriation act approved April 23, 1904, as follows:

For a survey and estimate of cost of a wagon road from Valdes to Fort Egbert, on the Yukon River, to be made under the direction of the Secretary of War, twenty-five thousand dollars, to be immediately available; said survey and estimate herein provided shall be submitted to Congress at the earliest practicable day.

For surveying and locating a military trail, under the direction of the Secretary of War, by the shortest and most practicable route, between the Yukon River and Coldfoot, on the Koyukuk River, twenty-five hundred dollars, to be immediately available, and a report and estimate upon said trail to be submitted to Congress at the earliest practicable day.

At the beginning of the year the surveys were in progress.

The survey from Valdes to Fort Egbert, Alaska, was completed on August 14, 1904, and the parties reached Seattle on September 29, 1904.

The survey from Yukon River to Coldfoot, Alaska, was completed, and the party returned to Seattle on August 31, 1904.

Preliminary reports were submitted on December 15, 1904, and were published in House Document No. 192, Fifty-eighth Congress, third session.

No provision was made by Congress for work on the roads and trail for which the surveys were made.

Under an act of Congress road work in Alaska is now provided for by expenditures from the revenue of the Territory under a commission appointed by the Secretary of War.

2846 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

*Money statements.*

VALDES-FORT EGBERT SURVEY.

July 1, 1904, balance unexpended .....	\$19,931.65
Amount appropriated by sundry civil act approved March 3, 1905 .....	5,700.63
Received by transfer .....	260.00
	<hr/>
	25,892.28
June 30, 1905, amount expended during fiscal year .....	24,615.10
	<hr/>
July 1, 1905, balance unexpended .....	1,277.18
July 1, 1905, outstanding indebtedness .....	1,200.00
	<hr/>
July 1, 1905, balance available .....	77.18

YUKON-COLDFOOT SURVEY.

July 1, 1904, balance unexpended .....	\$2,365.55
Amount appropriated by sundry civil act approved March 3, 1905 .....	1,431.15
	<hr/>
	3,796.70
June 30, 1905, amount expended during fiscal year .....	3,790.22
	<hr/>
July 1, 1905, balance unexpended .....	6.48

APPENDIX L L L.

L A W S

AFFECTING

THE CORPS OF ENGINEERS, UNITED STATES ARMY.

FIFTY-EIGHTH CONGRESS, THIRD SESSION.  
1904-1905.

**CHAP. 21.**—An Act Authorizing the Secretary of the Interior to authorize the building of a bridge across Thief River, in the State of Minnesota.

Dec. 21, 1904.  
Vol. 33, p. 595.

[S. 708.]  
[Public, No. 2.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Interior is hereby authorized and empowered to authorize the proper public municipal authorities to construct a free wagon bridge across Thief River, in the State of Minnesota, at such point and subject to such conditions and restrictions as he may designate and require.

Thief River,  
Minn.  
Construction  
of a free  
wagon bridge  
across, author-  
ized.

Approved, December 21, 1904.

**CHAP. 24.**—An Act Making appropriations to supply urgent deficiencies in certain appropriations for the fiscal year ending June thirtieth, nineteen hundred and five, and for other purposes.

Jan. 5, 1905.  
Vol. 33, p. 602.

[H. R. 16445.]  
[Public, No. 5.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in certain appropriations for the fiscal year nineteen hundred and five, and for other purposes, namely:

Urgent defi-  
ciencies appro-  
priations.

\* \* \* \* \*

WAR DEPARTMENT.

War Depart-  
ment.

WASHINGTON MONUMENT.

Washington  
Monument.

For the purchase of new hoisting cables and counterweight cables for the elevator in the Washington Monument, two thousand five hundred dollars.

Elevator ca-  
bles, etc.

\* \* \* \* \*

Approved, January 5, 1905.

Jan. 7, 1905. **CHAP. 32.**—An Act To amend an Act approved April twenty-sixth, nineteen hundred and four, entitled "An Act to enable the Secretary of War to permit the erection of a lock and dam in aid of navigation in the Tennessee River near Chattanooga, Tennessee, and for other purposes."

Tennessee  
River, Tenn.  
Construction  
of lock and  
dam in, near  
Chattanooga.  
Vol. 33, p.  
309.

Location.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Act of Congress approved April twenty-sixth, nineteen hundred and four, entitled "An Act to enable the Secretary of War to permit the erection of a lock and dam in aid of navigation in the Tennessee River near Chattanooga, Tennessee, and for other purposes," be, and the same is hereby, amended by inserting in section one, line seven, after the words "Scott Point," "near Chattanooga, Tennessee," and before the word "under," the following: "or at such other point or place in the mountain section of said river below Scott Point as the Secretary of War may approve."

Approved, January 7, 1905.

Jan. 11, 1905. **CHAP. 38.**—An Act To amend an Act entitled "An Act to authorize Washington and Westmoreland counties, in the State of Pennsylvania, to construct and maintain a bridge across the Monongahela River, in the State of Pennsylvania," approved February twenty-first, nineteen hundred and three.

Monongahela  
River, Pa.  
Time extend-  
ed for bridg-  
ing, by Wash-  
ington and  
Westmoreland  
counties, Pa.  
Vol. 32, p.  
851, amended.

Time of con-  
struction.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section seven of an Act entitled "An Act to authorize Washington and Westmoreland counties, in the State of Pennsylvania, to construct and maintain a bridge across the Monongahela River, in the State of Pennsylvania," approved February twenty-first, nineteen hundred and three, be, and is hereby, amended to read as follows:

"SEC. 7. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from February twenty-first, nineteen hundred and five."

Approved, January 11, 1905.

Jan. 12, 1905. **CHAP. 36.**—An Act To build a bridge across the Ouachita River, Arkansas.

[H. R. 15317.]  
[Public, No.  
9.]

Ouachita  
River.  
Inter - Urban  
Transit Com-  
pany may  
bridge, at Cam-  
den, Ark.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Inter-Urban Transit Company, a corporation organized and existing under and by virtue of the laws of the State of Arkansas, be, and it is hereby, authorized to construct and maintain a drawbridge across the Ouachita River, in the State of Arkansas, at or near

Camden, Arkansas, at a point which may hereafter be selected by said Inter-Urban Transit Company for crossing said river with its line of railway and agreed upon by the Secretary of War. Said bridge shall be constructed to provide for the passage of electric-railway cars; and all street railroad companies desiring the use of the bridge shall have equal privileges in the passage of trains, or cars, over the same and over the approaches thereto, upon payment of a reasonable compensation for such use; and in case of disagreement in regard to the terms of such use, or the rates to be paid, the matter at issue shall be decided by the Secretary of War.

Electric rail-  
way draw-  
bridge.  
Use by other  
companies.

Compensation.

SEC. 2. That the bridge herein authorized to be constructed shall be so kept and managed by the company owning or operating the same as to afford proper ways and means for the passage through or under it of vessels, barges, or rafts at all times, both by day and by night; and there shall be displayed on said bridge by the owners thereof from sunset to sunrise such lights and signals as the Light-House Board shall prescribe: *Provided*, That the erection of such bridge as herein authorized shall not be permitted to interfere with any bridge or structure now maintained across said river.

Unobstructed  
navigation.

Lights, etc.

*Proviso.*  
Interference  
with existing  
bridges pro-  
hibited.

SEC. 3. That if said bridge erected and maintained under the authority of this Act shall at any time substantially or materially obstruct the free navigation of said river, or shall, in the opinion of the Secretary of War, obstruct such navigation, he is hereby authorized to cause such change or alteration of said bridge to be made as will effectually obviate such obstruction, and such alteration shall be made and all such obstructions shall be removed at the expense of the owner or owners of said bridge; and in case of any litigation arising from any obstruction or alleged obstruction to the free navigation of said river, the case may be brought in the district court of the United States, in the State of Arkansas, for the district in which any portion of said obstruction or bridge may be located: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers or to exempt said bridge from the operation of the same.

Obstruction to  
navigation.

Litigation.

*Proviso.*  
Protection to  
navigation.

SEC. 4. That the bridge authorized to be constructed under this Act shall be built and located under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the said company or corporation shall submit to the Secretary of War, for his examination and approval, a design and drawings of said bridge and a map of the location, giving for the space of one mile above and one mile below the proposed location of the bridge the topography of the banks of the river, with shore lines at high and low water, and shall furnish such other information as may be required for a full and satis-

Secretary of  
War to ap-  
prove plans,  
etc.

- factory understanding of the subject; and until the said plans and the location of the bridge are approved by the Secretary of War the bridge shall not be built, and should any change be made in the plans of said bridge during the process of construction or after completion such change shall be subject to the approval of the Secretary of War; and said structure shall be changed from time to time at the cost of the owners thereof, as the Secretary of War may direct, so as to preserve the free and convenient navigation of said river.
- Changes.**
- Lawful structure and post route.** SEC. 6. That any bridge built under the provisions of this Act shall be a lawful structure, and shall be recognized and known as a post route, upon which no higher charge shall be made for the transportation over the same of the mails, troops, and munitions of war of the United States passing over said bridge than the rate per mile paid for the transportation over the public highways leading to said bridge; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies; and the United States shall have the right of way across said bridge and approaches for postal telegraph purposes.
- Telegraph, etc., rights.**
- Time of construction.** SEC. 7. That this Act shall be null and void unless the bridge herein authorized is commenced within one year and completed within three years from the date hereof.
- Amendment.** SEC. 8. That the right to alter, amend, or repeal this Act is hereby expressly reserved.
- Approved, January 12, 1905.

Jan. 12, 1905.  
Vol. 33, pt. 2,  
p. 1725.

**CHAP. 38.**—An Act For the relief of James F. McIndoe.

[S. 1501.]  
[Private, No.  
29.]  
James F. Mc-  
Indoe.  
Payment to.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Treasury be, and he is hereby, authorized and directed to pay, out of any money in the Treasury not otherwise appropriated, to James F. McIndoe, captain, Corps of Engineers, late first lieutenant, Corps of Engineers, United States Army, the sum of one thousand one hundred and forty-two dollars and seventy cents, being the value of his personal effects destroyed by fire on the thirteenth day of February, nineteen hundred and one, through the destruction by fire of the engineer quarters at Fort Hancock, New Jersey, as determined by a board of survey which met by order of Major-General Brooks [<sup>a</sup>] at Fort Hancock, New Jersey, on the fifteenth day of March, nineteen hundred and one.

Approved, January 12, 1905.

<sup>a</sup> Brooke.



[No. 3.] Joint Resolution Granting the temporary occupancy of a part of the Government reservation in Washington, District of Columbia, for the American Railway Appliance Exhibition. Jan. 12, 1905. Vol. 33, p. 1275.

[S. J. R. 79.]  
[Pub. Res.,  
No. 2.]

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,*

That the Secretary of War is hereby authorized to grant permits, under such restrictions as he may deem necessary, to the general committee of arrangements of the American Railway Appliance Exhibition, to be given in connection with the meeting of the International Railway Congress, for the use of such portion of the public reservation fronting on the south side of B street, between Fourteenth street and the Sixteenth street roadway northwest, being a part of the unimproved portion of the Monument Grounds in the city of Washington, which, in his opinion, will inflict no serious or permanent injuries upon said reservation, to continue from March twentieth to May twenty-fifth, nineteen hundred and five, inclusive: *Provided, however,* That all stands, platforms, or other temporary structures that may be erected on the space aforesaid shall be under the supervision of said general committee of arrangements and in accordance with plans to be approved by the officer in charge of public buildings and grounds.

District of  
Columbia.  
American  
Railway Ap-  
pliance Exhi-  
bition may oc-  
cupy Govern-  
ment reserva-  
tion in.

Location.

*Proviso.*  
Temporary  
structures.

SEC. 2. That the Commissioners of the District of Columbia be, and are hereby, authorized to permit said general committee of arrangements for the American Railway Appliance Exhibition to convey to such reservation, through suitable conductors, wherever necessary, and in the nearest practicable connection with the present supply thereof, gas, steam, and electricity for power, heat, and light, necessary for such exhibition: *Provided,* That said conductors shall not be used for the conducting of steam or electric current after May fifteenth, nineteen hundred and five, and shall, with their supports, be fully and entirely removed from the streets and avenues of the said city of Washington on or before May twenty-fifth, nineteen hundred and five: *Provided further,* That the work of conveying such conductors to the reservation and removing of said conductors shall be in accordance with plans to be approved by and under the supervision of the Commissioners of the District of Columbia, who shall see that the provisions of this resolution are enforced, and that all needful precautions are taken for the protection of the public, and that the pavement of any street, avenue, or alley disturbed is replaced in as good condition as before entering upon the work herein authorized: *Provided further,* That no expense or damage on account of or due to the conveying, operation, or removal of the said temporary conductors shall be incurred by the United States or the District of Columbia.

Use of gas,  
steam, and elec-  
tric power.

*Provisos.*  
Removal of  
conductors.

Time limit.

Plans to be  
approved by  
the Commis-  
sioners.

No expense  
to be incurred  
by the United  
States, etc.

SEC. 3. That the Commissioners of the District of Columbia be, and are hereby, authorized to permit said

Temporary oc-  
cupation of  
streets granted.

**Restrictions.** general committee of arrangements to temporarily occupy parts of streets with tracks and switches for the accommodation of the exhibitors attending said exhibition; provided that such temporary occupation shall not exceed the period of sixty days, and shall be subject to conditions prescribed by said Commissioners.

**Extension of overhead telegraph and telephone wires granted.**

**Removal of wires.** SEC. 4. That the Commissioners of the District of Columbia be, and are hereby, authorized to permit the Western Union Telegraph Company, the Postal Telegraph Company, and the Chesapeake and Potomac Telephone Company to extend overhead wires to said reservation and to such points thereon as shall be deemed necessary and convenient by said general committee of arrangements, the said wires to be taken down within ten days after the conclusion of the meeting of the International Railway Congress on the fourteenth day of May, nineteen hundred and five.

**Bond.**

SEC. 5. That said general committee of arrangements, prior to the issuance of the permits hereinbefore authorized, shall make such necessary deposits with the collector of taxes, District of Columbia, as may be required by the Commissioners of the District of Columbia, to guarantee the removal of any of the appurtenances placed in public space and the restoration of public works disturbed by such occupation, and said general committee shall also by proper bond, approved by said Commissioners, save the District of Columbia harmless from any claim for damages arising in any manner from their occupation of public space under this Act.

Approved, January 12, 1905.

Jan. 17, 1905. [No. 4.] Joint Resolution Authorizing the granting of permits to the committee on inaugural ceremonies on the occasion of the inauguration of the President-elect on March fourth, nineteen hundred and five, and so forth.  
Vol. 33, P. 1276.  
[S. J. R. 84.]  
[Pub. Res., No. 3.]

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, \* \* \**

**Reservations, etc., Washington, D. C.**

**Streets, avenues, etc.** SEC. 2. That the Secretary of War is hereby authorized to grant permits, under such restrictions as he may deem necessary, to the committee on inaugural ceremonies for the use of any reservations or other public spaces in the city of Washington on the occasion of the inauguration of the President-elect on the fourth day of March, nineteen hundred and five, which, in his opinion, will inflict no serious or permanent injuries upon such reservations or public spaces or statuary thereon, and the Commissioners of the District of Columbia may designate for such and other purposes on the occasion aforesaid such streets, avenues, and sidewalks in said city of Washington as they

may deem proper and necessary: *Provided, however,* That all stands or platforms that may be erected on the public spaces aforesaid shall be under the supervision of the said inaugural committee and in accordance with the plans and designs to be approved by the Engineer Commissioner of the District of Columbia, the officer in charge of public buildings and grounds, and the Superintendent of the United States Capitol Building and Grounds: *And provided further,* That the reservations or public spaces occupied by the stands or other structures shall be restored to their original condition before such occupation, and that the inaugural committee shall indemnify the War Department for any damage to structures of any kind whatsoever upon such reservation or spaces.

SEC. 3. That the Commissioners of the District of Columbia are hereby authorized to permit the committee on illumination of the inaugural committee for the inaugural ceremonies, March, nineteen hundred and five, to stretch suitable overhead conductors, with sufficient supports wherever necessary and in the nearest practicable connection with the present supply of light, for the purpose of effecting the said illumination: *Provided,* That if it shall be necessary to erect wires for illumination purposes over any park or reservation in the District of Columbia, the work of erection and removal of said wires shall be under the supervision of the official in charge of said park or reservation: *Provided further,* That the said conductors shall not be used for the conveying of electrical currents after March seventh, nineteen hundred and five, and shall, with their supports, be fully and entirely removed from the streets and avenues of the said city of Washington on or before March fifteenth, nineteen hundred and five: *Provided further,* That the stretching and removing of the said wires shall be under the supervision of the Commissioners of the District of Columbia, who shall see that the provisions of this resolution are enforced; that all needful precautions are taken for the protection of the public, and that the pavement of any street, avenue, or alley disturbed is replaced in as good condition as before entering upon the work herein authorized: *Provided further,* That no expense or damage on account of or due to the stretching, operation, or removing of the said temporary overhead conductors shall be incurred by the United States or the District of Columbia.

\* \* \* \* \*

SEC. 6. That the Commissioners of the District of Columbia be, and they are hereby, authorized to permit the Western Union Telegraph Company and the Postal Telegraph Company to extend overhead wires into the Pension Building and to such points along the line of parade as shall be deemed by the chief marshal convenient for use in connection with the parade and other inaugural

*Provides.*  
Platforms,  
etc., supervi-  
sion of, etc.

Indemnifica-  
tion for dam-  
ages.

Use of con-  
ductors for il-  
lumination.

*Provides.*  
Supervision  
of the work.

Time limit.

Removal of  
wires.

No expense,  
etc., to the  
United States.

Temporary  
telegraph  
wires.

Removal of  
wires.

purposes, the said wires to be taken down within ten days after the conclusion of the ceremonies on the fourth day of March, nineteen hundred and five.

**Temporary occupation of streets by railroads.** SEC. 7. That the Commissioners of the District of Columbia are hereby authorized to issue to steam railroad companies in said District permits to temporarily occupy additional parts of the streets for the purpose of accommodating the traveling public attending the inaugural ceremonies in March, nineteen hundred and five: *Provided*, That such temporary occupation shall not exceed the period of fifteen days and shall be subject to conditions prescribed by said Commissioners: *Provided further*, That no temporary tracks shall be laid upon or over any of the parks of the city.

**Proviso. Time limit.**

**Restrictions.**

Approved, January 17, 1905.

Jan. 18, 1905. **CHAP. 42.**—An Act To authorize the county of Itawamba, in Vol. 33, p. the State of Mississippi, to construct a bridge across the Tombigbee River, near the town of Fulton, in the said county and 606. State.

[H. R. 15606.]  
[Public, No. 11.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the county of Itawamba, one of the counties of the State of Mississippi, duly created and organized under and by virtue of the laws of the said State, is hereby authorized and empowered to erect, construct, and maintain a bridge, by and through its proper officers, over the Tombigbee River, near the town of Fulton, Mississippi, at the point on said river where the public road from Fulton, Mississippi, to Tupelo, Mississippi, now crosses the said river: *Provided*, That the plans and location of the said bridge shall be approved by the Secretary of War before the construction of the bridge is commenced. Said bridge shall be constructed to provide for the passage of wagons and vehicles of all kinds, for the transit of animals, and for foot passengers, under such rules and regulations as may be laid down by the proper officers of said county under the laws of the said State of Mississippi.

**Tombigbee River.**  
**Itawamba County may bridge, at Fulton, Miss.**

**Proviso. Secretary of War to approve plans, etc.**  
**Wagon and foot bridge.**

**L a w f u l structure and post route.** SEC. 2. That the bridge shall be a lawful structure, and shall be known and recognized as a post route, and shall enjoy the rights and privileges of other post-roads of the United States; and no charge shall be made for the transmission over same of the mails, troops, and munitions of war of the United States. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal, telegraph, and telephone purposes; and any changes in the said bridge which the Secretary of War may require in the interest of navigation shall be

**Telegraph, etc., rights.**

**Changes.**

made by the person or corporation owning or operating the same at their own expense.

SEC. 3. That this Act shall be null and void if actual construction of said bridge herein authorized shall not be commenced in one year and completed within three years from the date of approval hereof. Time of construction.

SEC. 4. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, January 18, 1905.

CHAP. 43.—An Act To authorize Caldwell Parish, Louisiana, to construct a bridge across the Ouachita River. Jan. 18, 1905.  
Vol. 33, p. 606.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the parish of Caldwell, Louisiana, through its corporate authority, is hereby authorized and empowered to construct and maintain a wagon and foot bridge, with necessary approaches, across the Ouachita River at the town of Columbia, in said parish. Such bridge shall be constructed to provide for the passage of wagons and vehicles of all kinds, animals, foot passengers, and for all road travel. [H. R. 15810.]  
[Public, No. 12.]  
Ouachita River.  
Caldwell Parish may bridge, at Columbia, La.  
Wagon and foot bridge.

SEC. 2. That the said bridge shall be constructed under and subject to such regulations for the security of navigation as the Secretary of War shall prescribe; and to secure that object the said parish shall submit for his examination and approval a design and drawing of the bridge and a map of the location; and until the location and plan of the bridge are approved by the Secretary of War the bridge shall not be commenced or built; and should any change be made in the plan of said bridge, during the progress of construction or after completion, such change shall be subject to the approval of the Secretary of War; and that said company shall, at its own expense, make from time to time such changes in said bridge as the Secretary of War may order in the interest of navigation. Secretary of War to approve plans, etc.  
  
Changes.

SEC. 3. That said bridge shall be a lawful structure, and shall be recognized and known as a post route, and shall enjoy the rights and privileges of other post-roads in the United States; and no higher charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States than the rate per mile paid for the transportation over the road or roads leading to such bridge. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal-telegraph and telephone purposes; and all changes in said bridge required by the Secretary of War at any time, or Lawful structure and post route.  
  
Telegraph, etc., rights.



its entire removal, shall be at the expense of the corporation owning or operating said bridge.

**Amendment.** SEC. 4. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

**Time of construction.** SEC. 5. That this Act shall be null and void unless the bridge authorized is commenced within one year and completed within three years from the date of approval thereof.

Approved, January 18, 1905.

Jan. 18, 1905.  
Vol. 33, p. 607.

[H. R. 15981.]  
[Public, No.  
13.]

**CHAP. 44.**—An Act To amend an Act entitled "An Act to authorize the Pearl and Leaf Rivers Railroad Company to bridge Pearl River, in the State of Mississippi."

Pearl River.  
Mississippi  
Central Rail-  
road Company  
may bridge, at  
Smiths Ferry,  
Miss.  
Vol. 32, p. 924.

Vol. 32, p. 925,  
amended.

Time of con-  
struction.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Mississippi Central Railroad Company, a railroad corporation duly incorporated and organized under the laws of the State of Mississippi (formerly the Pearl and Leaf Rivers Railroad Company), its successors and assigns, be, and is hereby, authorized to construct and maintain the bridge mentioned in the Act approved March second, nineteen hundred and three, entitled "An Act to authorize the Pearl and Leaf Rivers Railroad Company to bridge Pearl River in the State of Mississippi," under and subject to the provisions of the said Act, provided the actual construction of the bridge therein authorized be commenced within one year and completed within three years from the date of approval of this Act.

Approved, January 18, 1905.

Jan. 19, 1905.  
Vol. 33, p. 607.

[S. 5889.]  
[Public, No.  
14.]

**CHAP. 47.**—An Act To authorize the city of Minneapolis, in the State of Minnesota, to construct a bridge across the Mississippi River.

Mississippi  
River.  
Minneapolis,  
Minn., may  
bridge.

Street car,  
wagon, and  
foot bridge.

Secretary of  
War to ap-  
prove plans,  
etc.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the city of Minneapolis, in the State of Minnesota, is hereby authorized and empowered to construct, operate, and maintain a street-car, wagon, and foot bridge, with necessary approaches, across the Mississippi River from the west end of Twenty-fifth avenue northeast to the east end of Thirty-second avenue north, within the corporate limits of said city, provided such location is suitable to the interests of navigation. Said bridge shall be constructed for the passage of street cars, wagons, and vehicles of all kinds, and for foot passengers.

SEC. 2. That the said bridge authorized to be constructed under this Act shall be built and constructed upon plans to be submitted to and approved by the Secretary of War, subject to such rules and regulations for the

security of navigation as the Secretary of War shall prescribe, and until the plans and location of the bridge are approved by him the bridge shall not be built or commenced.

SEC. 3. That said bridge shall be a lawful structure, and shall be recognized and known as a post route, and shall enjoy the rights and privileges of other post-roads in the United States; and no higher charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States than the rate per mile paid for the transportation over the road or roads leading to such bridge. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal-telegraph and telephone purposes, and all changes in said bridge required by the Secretary of War, at any time, or its entire removal, shall be at the expense of the corporation owning or operating said bridge.

Lawful structure and post route.

Telegraph, etc., rights.

Changes.

SEC. 4. That all street railway companies desiring the use of said bridge shall be entitled to equal rights and privileges relative to the passage of cars over the same and the approaches thereto, upon payment of reasonable compensation for such use; and in case of disagreement as to the rates, terms, and conditions of such use all matters at issue shall be determined by the Secretary of War.

Use by other roads.

Compensation.

SEC. 5. That this Act shall be null and void unless the bridge herein authorized is commenced within one year and completed within three years from the date of approval hereof.

Time of construction.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 19, 1905.

CHAP. 48.—An Act Permitting the building of a railroad bridge across the Mississippi River at the city of Minneapolis, State of Minnesota, from a point on lot two to a point on lot seven, all in section three, township twenty-nine north, range twenty-four west, of the fourth principal meridian.

Jan. 19, 1905. Vol. 33, p. 608.

[S. 6261.]  
[Public, No. 15.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the consent of Congress is hereby granted to the Minneapolis, Saint Paul and Sault Sainte Marie Railway Company, a railway corporation organized under the laws of the States of Michigan, Wisconsin, Minnesota, and North Dakota, its successors or assigns, to build a railway bridge across the Mississippi River at the city of Minneapolis, State of Minnesota, from a point on lot two to a point on lot seven, all in section three, township twenty-nine north, range twenty-four west, of the fourth principal meridian: *Provided*, That the plans for the construction of said bridge and appurtenant works shall

Mississippi River. Minneapolis, Saint Paul and Sault Sainte Marie Railway Company may bridge, at Minneapolis, Minn.

Provisos. Approval of plans.



- Changes. be submitted to and approved by the Chief of Engineers and the Secretary of War before the commencement of the construction of such bridge: *And provided further*, That said Minneapolis, Saint Paul and Sault Sainte Marie Railway Company, its successors or assigns, shall not deviate from such plans after such approval, either before or after the completion of the said bridge, unless the modification of said plans shall have previously been submitted to and received the approval of the Chief of Engineers and of the Secretary of War, and any changes in said bridge which the Secretary of War may at any time order in the interest of navigation shall be promptly made by said company at its own expense.
- Litigation. SEC. 2. That in case any litigation arises from the building of said bridge or from the obstruction of said river by said bridge cases may be tried in the proper courts, as now provided for that purpose in the States of Minnesota and North Dakota and in the courts of the United States: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers or to exempt said bridge from the operation of same.
- Proviso. Existing laws not affected.*
- Use by other roads. SEC. 3. That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same, and over the approaches thereto, upon payment of a reasonable compensation for such use; and in case of disagreement between the parties in regard to the compensation to be paid or the conditions to be observed all matters at issue shall be determined by the Secretary of War.
- Compensation.
- Lawful structure and post route.* SEC. 4. That any bridge built under this Act, and subject to its limitations, shall be a lawful structure, and shall be recognized and known as a post route, upon which no higher charge shall be made for the transmission of mails and the troops and munitions of war of the United States over the same than the rate per mile paid for the transportation over the railroad or approaches leading to the said bridge; and it shall enjoy the rights and privileges of other post-roads in the United States, and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal telegraph and telephone purposes.
- Telegraph, etc., rights.
- Time of construction. SEC. 5. That this Act shall be null and void unless the bridge herein authorized be commenced within one year and completed within two years from the date of approval of this Act.
- Amendment. SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 19, 1905.

**CHAP. 138.**—An Act Permitting the building of a railroad bridge across the Red River of the North from a point on section six, township one hundred and fifty-four north, range fifty west, Marshall County, Minnesota, to a point on section thirty-six, township one hundred and fifty-five north, range fifty-one west, Walsh County, North Dakota.

Jan. 24, 1905.  
Vol. 33, p. 614.  
[H. R. 16720.]  
[Public, No. 24.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

That the consent of Congress is hereby granted to the Minneapolis, Saint Paul and Sault Sainte Marie Railway Company, a railway corporation organized under the laws of the States of Michigan, Wisconsin, Minnesota, and North Dakota, its successors or assigns, to build a railway bridge across the Red River of the North, suitable to the interests of navigation, from a point on section six, township one hundred and fifty-four north, range fifty west, Marshall County, Minnesota, to a point on section thirty-six, township one hundred and fifty-five north, range fifty-one west, Walsh County, North Dakota: *Provided*, That drawings showing the plans and location of said bridge and appurtenant works shall be submitted to the Chief of Engineers and the Secretary of War for approval, and until approved by them the construction of such bridge shall not be commenced: *And provided further*, That said Minneapolis, Saint Paul and Sault Sainte Marie Railway Company, its successors or assigns, shall not deviate from such plans after such approval, either before or after the completion of the said bridge, unless the modification of said plans shall have previously been submitted to and received the approval of the Chief of Engineers and of the Secretary of War; and any changes in said bridge which the Secretary of War may at any time order in the interest of navigation shall be promptly made by said company at its own expense.

Red River of the North, Minn.  
Minneapolis, Saint Paul and Sault Sainte Marie Railway Company may bridge.  
Railway bridge.  
Location.

*Provides.*  
Secretary of War to approve plans, etc.

Changes.

**SEC. 2.** That in case any litigation arises from the building of said bridge or from the obstruction of said river by said bridge, cases may be tried in the proper courts, as now provided for that purpose in the States of Minnesota and North Dakota and in the courts of the United States: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers, or to exempt said bridge from the operation of same.

Litigation.

*Proviso.*  
Existing laws not affected.

**SEC. 3.** That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same and over the approaches thereto upon payment of a reasonable compensation for such use; and in case of disagreement between the parties in regard to the compensation to be paid or the conditions to be observed all matters at issue shall be determined by the Secretary of War.

Use by other roads.

**SEC. 4.** That any bridge built under this Act and subject to its limitations shall be a lawful structure, and shall

Lawful structure and post route.

be recognized and known as a post route, upon which no higher charge shall be made for the transmission of mails and the troops and munitions of war of the United States over the same than the rate per mile paid for the transportation over the railroad or approaches leading to the said bridge; and it shall enjoy the rights and privileges of other post-roads in the United States, and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal telegraph and telephone purposes.

**Telegraph, etc., rights.**

**Time of construction.** SEC. 5. That this Act shall be null and void unless the bridge herein authorized be commenced within one year and completed within two years from the date of approval of this Act.

**Amendment.** SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 24, 1905.

Jan. 24, 1905. Vol. 33, p. 616. **CHAP. 139.**—An Act To authorize the county of Sunflower to construct a bridge across the Sunflower River, Mississippi.

[H. R. 16992.]  
[Public, No. 25.]

**Sunflower River.**  
**Sunflower County, Miss., may bridge.**

**Location.**

**Proviso.**  
**Secretary of War to approve plans, etc.**  
**Wagon and foot bridge.**

**Lawful structure and post route.**

**Telegraph, etc., rights.**

**Changes.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the county of Sunflower, one of the counties of the State of Mississippi, duly created and organized under and by virtue of the laws of the said State, is hereby authorized and empowered to erect, construct, and maintain a bridge, by and through its proper officers, over the Sunflower River, near Vicks Landing, in the County of Sunflower, State of Mississippi, at the point on said river where a public road from Indianola, Mississippi, to Inverness, Mississippi, will cross the said river: *Provided,* That the plans and location of the said bridge are approved by the Secretary of War before the construction of the bridge is commenced. Said bridge shall be constructed to provide for the passage of wagons and vehicles of all kinds, for the transit of animals, and for foot passengers, under such rules and regulations as may be laid down by the proper officers of said county under the laws of the said State of Mississippi.

SEC. 2. That the bridge shall be a lawful structure, and shall be known and recognized as a post route, and shall enjoy the rights and privileges of other post-roads of the United States, and no charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal, telegraph, and telephone purposes; and any changes in the said bridge which the Secretary of War

may require in the interest of navigation shall be made by the person or corporation owning or operating the same at their own expense.

SEC. 3. That this Act shall be null and void if actual construction of said bridge herein authorized shall not be commenced in two years and completed within three years from the date of approval hereof.

Time of construction.

SEC. 4. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 24, 1905.

**CHAP. 277.**—An Act To provide for the construction and maintenance of roads, the establishment and maintenance of schools, and the care and support of insane persons in the district of Alaska, and for other purposes.

Jan. 27, 1905.  
Vol. 33, p. 616.

[S. 3728.]  
[Public, No. 26.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That all moneys derived from and collected for liquor licenses, occupation, or trade licenses outside of the incorporated towns in the district of Alaska shall be deposited in the Treasury Department of the United States, there to remain as a separate and distinct fund, to be known as the "Alaska fund," and to be wholly devoted to the purposes hereinafter stated in the district of Alaska. One-fourth of said fund, or so much thereof as may be necessary, shall be devoted to the establishment and maintenance of public schools in said district; five per centum of said fund shall be devoted to the care and maintenance of insane persons in said district, or so much of said five per centum as may be needed; and all the residue of said fund shall be devoted to the construction and maintenance of wagon roads, bridges, and trails in said district.

Alaska.  
Liquor, trade, etc., license fees outside incorporated towns to constitute the "Alaska fund."  
Vol. 30, p. 1336.

Division and use of fund.

SEC. 2. That there shall be a board of road commissioners in said district, to be composed of an engineer officer of the United States Army to be detailed and appointed by the Secretary of War, and two other officers of that part of the Army stationed in said district and to be designated by the Secretary of War. The said engineer officer shall, during the term of his said detail and appointment, abide in said district. The said board shall have the power, and it shall be their duty, upon their own motion or upon petition, to locate, lay out, construct, and maintain wagon roads and pack trails from any point on the navigable waters of said district to any town, mining or other industrial camp or settlement, or between any such town, camps, or settlements therein, if in their judgment such roads or trails are needed and will be of permanent value for the development of the district; but no such road or trail shall be constructed to any town.

Construction of wagon roads, etc.  
Board of road commissioners to be appointed by Secretary of War.

Powers of board.

camp, or settlement which is wholly transitory or of no substantial value or importance for mining, trade, agricultural, or manufacturing purposes. The said board shall prepare maps, plans, and specifications of every road or trail they may locate and lay out, and whenever more than five thousand dollars in the aggregate shall have to be expended on the construction of any road or trail, contract for the work shall be let by them to the lowest responsible bidder, upon sealed bids, after due notice, under rules and regulations to be prescribed by the Secretary of War. The board may reject any bid if they deem the same unreasonably high or if they find that there is a combination among bidders. In case no responsible and reasonable bid can be secured, then the work may be carried on with material and men procured and hired by the board. The engineer officer of the board shall in all cases supervise the work of construction and see that the same is properly performed. As soon as any road or trail laid out by the board has been constructed and completed they shall examine the same and make a full and detailed report of the work done on the same to the Secretary of War, and in such report they shall state whether the road or trail has been completed conformable to the maps, plans, and specifications of the same. It shall be the duty of said board, as far as practicable, to keep in proper repair all roads and trails constructed under their supervision, and the same rules as to the manner in which the work of repair shall be done, whether by contract or otherwise, shall govern as in the case of the original construction of the road or trail. The cost and expenses of laying out, constructing, and repairing such roads and trails shall be paid by the Secretary of the Treasury out of the road and trail portion of said "Alaska fund" upon vouchers approved and certified by said board. The Secretary of the Treasury shall, at the end of each month, send by mail to each of the members of said board a statement of the amount available of said "Alaska fund" for the construction and repair of roads and trails, and no greater liability for construction or repair shall at any time be incurred by said board than the money available therefor at that time in said fund. The members of said board shall, in addition to their salaries, be entitled to receive their actual traveling expenses paid or incurred by them in the performance of their duties as members of the board.

Maps, etc.

Bids.

Supervision  
and examination  
of work.  
Report.

Repairs.

Expenses.

Restriction.

Repeal.

SEC. 9. That all Acts and parts of Acts inconsistent with this Act are, to the extent of such inconsistency, hereby repealed.

Approved, January 27, 1905.



**CHAP. 278.**—An Act Granting certain property to the county of Gloucester, New Jersey. Jan. 27, 1905. Vol. 33, p. 620.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Interior is hereby directed to convey, by proper patent, to the board of chosen freeholders of the county of Gloucester, in the State of New Jersey, to and for the use and benefit of said county, as a public park, such part of the abandoned Redbank Military Reservation in said county, not to exceed twenty acres, including the monument site twenty feet square, as may be designated by said board, after the same has been properly surveyed under the direction of the Commissioner of the General Land Office.

[S. 5763.]  
[Public, No. 27.]

Abandoned Redbank Military Reservation, N. J. Gloucester county granted use of part of, for memorial park.

**SEC. 2.** That the ownership, fee, and title conveyed by said patent shall revert to and reinvest in the United States, without any formal declaration of forfeiture thereof, at any time when said county shall fail to establish and maintain thereon a public park as a memorial to the battle fought thereon on October twenty-second, seventeen hundred and seventy-seven, or when said county shall use, or permit any part of said lands to be used, for any purpose not necessarily incident to the maintenance of such park.

Reversion in case of non-use.

Approved, January 27, 1905.

**CHAP. 279.**—An Act To extend the time for the completion of a bridge across the Missouri River at Yankton, South Dakota. Jan. 27, 1905. Vol. 33, p. 621.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section six of the Act approved March ninth, nineteen hundred and four, authorizing the Yankton, Norfolk and Southern Railway Company to construct a combined railroad, wagon, and foot passenger bridge across the Missouri River at or near the city of Yankton, South Dakota, be, and is hereby, amended by extending the time for commencing the construction of said bridge to March ninth, nineteen hundred and six, and by extending the time for completing said bridge to March ninth, nineteen hundred and eight.

[S. 5798.]  
[Public, No. 28.]

Missouri River. Time extended for bridging, by Yankton, Norfolk and Southern Railway Company, Yankton, S. Dak. Vol. 33, p. 62, amended.

Approved, January 27, 1905.

**CHAP. 281.**—An Act Authorizing the Lindsey Lumber Company, a corporation of Escambia County, Alabama, to construct a bridge across Conecuh River at or near the town of Pollard, in said county and State. Jan. 27, 1905. Vol. 33, p. 622.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Lindsey Lumber Company, a corpora-

[H. R. 17577.]  
[Public, No. 30.]

Conecuh River, Ala. Lindsey Lumber Company may bridge, near Pollard, Ala.

Secretary of War to approve plans, etc.

Unobstructed navigation.

Lights, etc.

Changes.

Lawful structure and post route.

Telegraph, etc., rights.

Time of construction.

Amendment.

tion of Escambia County, in the State of Alabama, be, and are hereby, authorized to construct, maintain, and operate a bridge across Conecuh River, in connection with a private railroad extending into their timbered lands; said bridge to be located at a point suitable to the interests of navigation at or near a point above the county bridge and near to the town of Pollard, in said State and county.

SEC. 2. That said bridge shall be built and located under and subject to such regulations for the security of navigation as the Secretary of War may prescribe; and to secure that object the Lindsey Lumber Company shall submit for his examination designs and drawings of the bridge, and maps of the location giving, for the space of one-half mile above and one-half mile below the proposed location, the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the currents, and the soundings, accurately showing the bed of the river, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until the said plans and location are approved by him the bridge shall not be commenced or built; and should any change be made in said bridge before or after completion, such change shall be likewise subject to the approval of the Secretary of War.

SEC. 3. That said bridge shall be kept and managed so as to offer reasonable and proper means for the passage of vessels through or under the same; and for the safety of vessels passing at night there shall be displayed on said bridge by the owners thereof, at their own expense, such lights or other signals as the Light-House Board may prescribe. And any changes in said bridge which the Secretary of War may at any time order in the interest of navigation shall be made by the owners thereof at their own expense.

SEC. 4. That the bridge constructed, maintained, and operated under this Act, and according to its limitations, shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transportation over the same of the mails, troops, and munitions of war of the United States than the rate per mile paid for transportation of said mails, troops, and munitions of war over public highways leading to said bridge; and the United States shall have the right of way for postal, telegraph, telephone, and other purposes over said bridge.

SEC. 5. That this Act shall be null and void if actual construction of the said bridge be not commenced in one year and completed in three years from the date hereof.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 27, 1905.



**CHAP. 286.**—An Act To authorize the construction of a bridge across Sunflower River in Sharkey County, Mississippi. Jan. 28, 1905. Vol. 33, p. 625.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Delta Southern Railway, a corporation organized and existing under and by virtue of the laws of the State of Mississippi, be, and is hereby, authorized to construct, maintain, and operate a railroad bridge, with as many tracks as it may deem necessary for railroad traffic, across the Sunflower River at a point suitable to the interests of navigation in the county of Sharkey and State of Mississippi. [H. R. 17100.] [Public, No. 32.] Sunflower River, Miss. Delta Southern Railway may bridge, in Sharkey County.

**SEC. 2.** That the bridge authorized to be constructed under this Act shall be located and built under and subject to such regulations for the security of the navigation of said river as the Secretary of War shall prescribe, and to secure that object the said corporation shall submit to the Secretary of War for his examination and approval a design and drawing of the bridge and a map of the location, giving, for the space of one mile above and below the proposed location, the depth and currents of the river at all points and the location of any other bridge or bridges, together with all other information touching said bridge and river as may be deemed requisite by the Secretary of War to determine whether said bridge, when built, will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water. Secretary of War to approve plans, etc.

**SEC. 3.** That the Secretary of War is hereby authorized and directed, upon receiving such plan and map and upon being satisfied that a bridge built on such plan and at such locality will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river, or injuriously affect the flow of water, to notify the said corporation that he approves the same; and upon receiving such notification the said corporation may proceed to the erection of said bridge, conforming strictly to the approved plan and location; but until the Secretary of War shall approve the plan and location of said bridge and notify the said corporation of the same in writing the bridge shall not be built or commenced, and should any change be made in the plan of the bridge during the progress of the work thereon, or after completion, such change shall be subject likewise to the approval of the Secretary of War; and the said bridge shall be changed by the said company at its own expense whenever the Secretary of War shall so direct in the interest of navigation. Unobstructed navigation. Changes.

**SEC. 4.** That any bridge constructed under this Act shall be a lawful structure, and shall be known as a post-road, for which no higher charge shall be made for the transportation of mail, troops, and munitions of war or other property of the United States over the same than Lawful structure and post route.

the rate per mile charged for such transportation over the  
 Telegraph, railways leading to said bridge. The United States  
 etc., rights. shall also have a right of way over said bridge for postal,  
 telegraph, and telephone purposes, and equal privileges  
 in the use of said bridge shall be granted to all telegraph  
 and telephone companies.

Lights, etc. SEC. 5. That the said bridge shall be so kept and man-  
 aged at all times as not to interfere with the passage of  
 vessels, barges, and rafts, both by day and by night, and  
 there shall be displayed on said bridge by the owner  
 thereof, from sunset to sunrise, such lights or other sig-  
 nals as the Light-House Board may prescribe.

Use by other SEC. 6. That all railroad companies desiring the use of  
 roads. said bridge shall have and be entitled to equal rights and  
 privileges relative to the passage of railway trains over  
 Compensation. the same and the approaches thereto upon payment of a  
 reasonable compensation for such use, or, in case of disa-  
 greement, upon such terms and conditions as shall be  
 prescribed by the Secretary of War upon hearing the  
 allegations and proofs of the parties in interest.

Time of con- SEC. 7. That this Act shall be null and void unless the  
 struction. bridge herein authorized shall be commenced within one  
 year and completed within three years from the date  
 hereof.

Amendment. SEC. 8. That the right to amend, alter, or repeal this  
 Act is hereby expressly reserved.

Approved, January 28, 1905.

Feb. 1, 1905. CHAP. 288.—An Act Providing for the transfer of forest re-  
 Vol. 33, p. 628. serves from the Department of the Interior to the Department of  
 [H. R. 8460.] Agriculture.  
 [Public, No. 34.]

*Be it enacted by the Senate and House of Representa-  
 tives of the United States of America in Congress assem-  
 bled, \* \* \**

Water rights SEC. 4. That rights of way for the construction and  
 granted for mining, etc., maintenance of dams, reservoirs, water plants, ditches,  
 purposes. flumes, pipes, tunnels, and canals, within and across the  
 forest reserves of the United States, are hereby granted  
 to citizens and corporations of the United States for  
 municipal or mining purposes, and for the purposes of  
 Regulations. the milling and reduction of ores, during the period of  
 their beneficial use, under such rules and regulations as  
 may be prescribed by the Secretary of the Interior, and  
 subject to the laws of the State or Territory in which  
 said reserves are respectively situated.

Approved, February 1, 1905.

**CHAP. 291.**—An Act To amend an Act entitled "An Act to authorize the construction of a bridge across the Tennessee River in Marion County, Tennessee," approved May twentieth, nineteen hundred and two.

Feb. 1, 1905.  
Vol. 33, p. 629.  
[H. R. 16570.]  
[Public, No. 37.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That an Act entitled "An Act to authorize the construction of a bridge across the Tennessee River in Marion County, Tennessee," approved May twentieth, nineteen hundred and two, be, and the same is hereby, revived and declared to be in full force and effect, and that section seven of said Act is hereby amended so as to read as follows:

Tennessee River.  
Time extended for bridging, in Marion County, Tenn., by Memphis-Chattanooga Railway.  
Vol. 32, p. 202, amended.

"SEC. 7. That this Act shall be null and void unless the bridge herein authorized shall be commenced within one year and completed within three years from the first day of January, nineteen hundred and five."

Time of construction.

Approved, February 1, 1905.

[No. 12.] Joint Resolution For the printing of a compilation of the laws of the United States relating to the improvement of rivers and harbors.

Feb. 1, 1905.  
Vol. 33, p. 1280.

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,* That there shall be printed three thousand copies of a compilation of the laws of the United States relating to the improvement of rivers and harbors, passed until and including the laws of the second session of the Fifty-eighth Congress, of which six hundred copies shall be for the use of the Senate, one thousand four hundred copies for the use of the House of Representatives, and one thousand copies for the use of the War Department, the said compilation to be printed under the direction of the Secretary of War.

[H. J. R. 164.]  
[Pub. Res., No. 11.]  
Rivers and harbors.  
Laws relating to improvement of, ordered printed.  
Distribution.  
Vol. 32, p. 375.

Approved, February 1, 1905.

**CHAP. 296.**—An Act To authorize the construction of a bridge across Red River at Shreveport, Louisiana.

Feb. 3, 1905.  
Vol. 33, p. 629.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the city of Shreveport, situated in the parish of Caddo, State of Louisiana, a municipal corporation duly incorporated and existing under and by virtue of the laws of the State of Louisiana, be, and is hereby, authorized to construct and maintain a traffic bridge and approaches thereto across the Red River, extending from such a point in the said city of Shreveport to such a point in the parish of Bossier as may be selected by said city of

[H. R. 17383.]  
Public, No. 39.]

Red River.  
Shreveport, La., may bridge.

Location.

Shreveport and approved by the Secretary of War. Said bridge shall be constructed to provide for the passage of vehicles, foot passengers, stock, and such other lawful traffic as may be desired, at such legal rates of toll as may be fixed by said city and approved by the Secretary of War.

**Wagon and foot bridge.**

**Lawful structure and post route.** SEC. 2. That said bridge built under this Act, and subject to its limitations, shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same of the mails, the troops and munitions of war of the United States than the rate paid for the transmission over the public highways leading to the said bridge, and shall enjoy the rights and privileges of other post-roads in the United States; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies; and the United States shall have the right of way across said bridge and its approaches for postal-telegraph purposes: *Provided*, That the bridge herein authorized to be constructed shall be so kept and managed by the said city or corporation owning or operating it as to afford proper ways and means for the passage through or under it of vessels, barges, or rafts at all times, both by day and by night; and if said bridge be constructed as a drawbridge, the draw shall be opened promptly upon reasonable signal for the passage of boats; and upon whatever kind of bridge is built there shall be displayed from sunset to sunrise, at the expense of said corporation, such lights and signals as the Light-House Board shall prescribe.

**Telegraph, etc., rights.**

**Proviso. Unobstructed navigation.**

**Opening draw.**

**Lights, etc.**

**Changes.** SEC. 3. That if said bridge, erected and maintained under the authority of this Act, shall at any time substantially or materially obstruct the free navigation of said river, or shall, in the opinion of the Secretary of War, obstruct such navigation, he is hereby authorized to cause such change or alteration of said bridge to be made as will effectually obviate such obstruction; and such alteration shall be made and all such obstructions be removed at the expense of the owners or operators of said bridge; and in case of any litigation arising from the obstruction or alleged obstruction to the free navigation of said river, the case may be brought in the district court of the United States for the western district of Louisiana: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers, or to exempt said bridge from the operation of same.

**Litigation.**

**Proviso. Existing laws not affected.**

**Secretary of War to approve plans, etc.** SEC. 4. That the bridge authorized to be constructed under this Act shall be built and located under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the said municipal corporation shall submit to the Secretary of War, for his examination and

approval, a design and drawing of said bridge and a map of the location, prepared with reference to known datum plane upon prescribed scales furnished by the engineer officer having supervision of said river, and giving, for the space of two miles above and two miles below the proposed location of the bridge, the topography of the banks of the river, with shore lines at high and low water, the direction and strength of the currents at all stages, and the soundings accurately showing the bed of the stream, the location of any other bridge or bridges, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject. And until said plans and location of the bridge are approved by the Secretary of War the bridge shall not be built; and should any change be made in the plan of the said bridge during the process of construction, or after completion, such change shall be subject to the approval of the Secretary of War.

SEC. 5. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date of the approval hereof.

Time of construction.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, February 3, 1905.

CHAP. 297.—An Act Making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and six, and for other purposes.

Feb. 3, 1905.  
Vol. 33, p. 631.  
[H. R. 15895.]  
[Public, No. 40.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, in full compensation for the service of the fiscal year ending June thirtieth, nineteen hundred and six, for the objects hereinafter expressed, namely:

Legislative, executive, and judicial expenses appropriations.

\* \* \* \* \*

# WAR DEPARTMENT.

War Department.

\* \* \* \* \*

It shall not be lawful to detail clerks or other civilian employees authorized for the Office of the General Staff for duty, temporary or otherwise, in any office or bureau of the War Department at Washington, District of Columbia, or to detail clerks or other employees from the War Department for service in the Office of the General Staff.

General Staff. Civilian details to or from, forbidden.

\* \* \* \* \*

OFFICE OF THE CHIEF OF ENGINEERS: For chief clerk, two thousand dollars; five clerks of class four; four

Engineer's office.



clerks of class three; four clerks of class two; four clerks of class one; one clerk, one thousand dollars; one assistant messenger, and two laborers; in all, thirty thousand eight hundred and forty dollars.

Civil engi-  
neers, etc.

Proviso.  
Limit, etc.

And the services of skilled draftsmen, civil engineers, and such other services as the Secretary of War may deem necessary, may be employed in the office of the Chief of Engineers, to carry into effect the various appropriations for rivers and harbors, fortifications, and surveys to be paid from such appropriations: *Provided*, That the expenditures on this account for the fiscal year ending June thirtieth, nineteen hundred and six, shall not exceed eighty thousand dollars; and that the Secretary of War shall each year, in the annual estimates, report to Congress the number of persons so employed and the amount paid to each.

\* \* \* \* \*

Public build-  
ings and  
grounds.

Clerks, mes-  
sengers, etc.

## PUBLIC BUILDINGS AND GROUNDS.

OFFICE OF PUBLIC BUILDINGS AND GROUNDS: For one assistant engineer, two thousand four hundred dollars; one clerk of class four, one clerk of class three, one messenger; landscape gardener, two thousand dollars; surveyor and draftsman, one thousand five hundred dollars; in all, ten thousand one hundred and forty dollars.

For chief clerk, at two thousand dollars, clerk and stenographer, at one thousand four hundred dollars, overseers, draftsmen, copyists, foremen, gardeners, mechanics, and laborers employed in the public grounds, thirty-five thousand dollars.

Watchmen.

For one sergeant of park watchmen, nine hundred and fifty dollars.

For day watchmen as follows: One in Franklin Park; one in Lafayette Park; two in Smithsonian Grounds; one in Judiciary Park; one in Lincoln Park and adjacent reservations; one at Iowa Circle; one at Thomas Circle and neighboring reservations; one at Washington Circle and neighboring reservations; one at Dupont Circle and neighboring reservations; one at McPherson and Farragut parks; one at Stanton Park and neighboring reservations; two at Henry and Seaton parks; one at Mount Vernon Park and adjacent reservations; one for the greenhouses and nursery; two at grounds south of Executive Mansion; one at Garfield Park; one at Monument Park; one at Monument Park Annex (Potomac Park); twenty-one in all, at seven hundred and twenty dollars each, fifteen thousand one hundred and twenty dollars.

For night watchmen as follows: Two in Smithsonian Grounds; one in Judiciary Park; two in Henry and Seaton parks; one in grounds south of Executive Mansion; one in Monument Park; one at Monument Park Annex (Potomac Park); two in Garfield Park; ten in all, at

seven hundred and twenty dollars each, seven thousand two hundred dollars.

For watchman for the care of the monument and dock at Wakefield, Virginia, the birthplace of Washington, three hundred dollars. Wakefield, Va.

For contingent and incidental expenses, including purchase of professional and scientific books and periodicals, books of reference, blank books, photographs, and maps, seven hundred dollars. Contingent expenses.

Of the foregoing amounts appropriated under Public Buildings and Grounds, the sum of twenty-nine thousand one hundred and thirty-five dollars shall be paid out of the revenues of the District of Columbia. Amount from District revenues.

\* \* \* \* \*

SEC. 2. That the pay of assistant messengers, firemen, watchmen, laborers, and charwomen provided for in this Act, except those employed in mints and assay offices, unless otherwise specially stated, shall be as follows: For assistant messengers, firemen, and watchmen, at the rate of seven hundred and twenty dollars per annum each; for laborers, at the rate of six hundred and sixty dollars per annum each, and for charwomen, at the rate of two hundred and forty dollars per annum each. Rates of pay, assistant messengers, firemen, etc.

SEC. 3. That the appropriations herein made for the officers, clerks, and persons employed in the public service shall not be available for the compensation of any persons incapacitated, otherwise than temporarily, for performing such service. No pay to permanently incapacitated persons.

SEC. 4. No part of any money appropriated by this or any other Act shall be used for purchasing, maintaining, driving, or operating any carriage or vehicle (other than those for the use of the President of the United States, the heads of the Executive Departments, and the Secretary to the President, and other than those used for transportation of property belonging to or in the custody of the United States), for the personal or official use of any officer or employee of any of the Executive Departments or other Government establishments at Washington, District of Columbia, unless the same shall be specifically authorized by law or provided for in terms by appropriation of money, and all such carriages and vehicles so procured and used for official purposes shall have conspicuously painted thereon at all times the full name of the Executive Department or other branch of the public service to which the same belong and in the service of which the same are used. Restriction on use of horses, carriages, etc.

SEC. 5. That all laws or parts of laws inconsistent with this Act are repealed. Name of Department to be painted on carriages, etc.

Approved, February 3, 1905. Repeal.



Feb. 6, 1905. **CHAP. 453.**—An Act To amend an Act approved July first, Vol. 33, p. 689. nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," and to amend an Act approved March eighth, nineteen hundred and two, entitled "An Act temporarily to provide revenue for the Philippine Islands, and for other purposes," and to amend an Act approved March second, nineteen hundred and three, entitled "An Act to establish a standard of value and to provide for a coinage system in the Philippine Islands," and to provide for the more efficient administration of civil government in the Philippine Islands, and for other purposes.

Philippine  
Islands, gov-  
ernment of.  
Bonds ex-  
empt from tax-  
ation.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That all bonds issued by the government of the Philippine Islands, or by its authority, shall be exempt from taxation by the Government of the United States, or by the government of the Philippine Islands or of any political or municipal subdivision thereof, or by any State, or by any county, municipality, or other municipal subdivision of any State or Territory of the United States, or by the District of Columbia.

Issue of  
bonds for pub-  
lic improve-  
ments author-  
ized.

**SEC. 2.** That for the purpose of providing funds to construct port and harbor works, bridges, roads, buildings for provincial and municipal schools, court-houses, penal institutions, and other public improvements for the development of the Philippine Islands by the general government thereof, the said government is authorized from time to time to incur indebtedness, borrow money, and to issue and sell therefor (at not less than par value in gold coin of the United States) registered or coupon bonds of such denominations and payable at such time or times, not later than forty years after the date of the approval of this Act, as may be determined by said government, with interest thereon not to exceed four and one-half per centum per annum: *Provided*, That the entire indebtedness of said government created by the authority conferred by this section shall not exceed at any one time the sum of five million dollars: *And provided further*, That the law of said government creating the indebtedness and authorizing the issue of the bonds under this section shall be approved by the President of the United States.

Provides.  
Maximum in-  
debtedness.

Approval by  
the President.

\* \* \* \* \*

Repeal.

**SEC. 12.** That all Acts or parts of Acts inconsistent with the provisions of this Act are hereby repealed.

Approved, February 6, 1905.

**CHAP. 455.**—An Act To authorize the construction of a bridge across the Arkansas River at or near Vanburen, Arkansas. Feb. 6, 1905. Vol. 33, p. 698.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Vanburen Electric Railway and Bridge Company, a corporation organized and existing under the laws of the State of Arkansas, and being empowered by the terms of its charter to construct its railway from a point on the south limits of the city of Vanburen, Arkansas, to Alma and Mulberry, Arkansas, and to build to or connect with other lines leading to Fort Smith, Arkansas, the construction and operation of said line of railway, involving the construction of a bridge across the Arkansas River at a point at or near the city of Vanburen, Arkansas, be, and the said Vanburen Electric Railway and Bridge Company, its successors and assigns, are hereby, authorized and empowered to construct said bridge across said river, and to maintain and operate the same as a railway, passenger, and wagon bridge.

[H. R. 17784.]  
[Public, No. 45.]

Arkansas  
River.  
Vanburen  
Electric Rail-  
way and Bridge  
Company may  
bridge, at Van-  
buren, Ark.

**SEC. 2.** That the bridge authorized to be constructed under this Act shall be built and located under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe; and to secure that object said company or corporation shall submit to the Secretary of War a design and drawing of said bridge for his examination and approval, and a map of its location, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until said plan and location of said bridge are approved by the Secretary of War said bridge shall not be commenced or built; and should any change be made in the plan of said bridge during the progress of the work of construction, or after completion, such change shall be subject to the approval of the Secretary of War: *Provided*, That if the bridge herein authorized be built as a drawbridge, the draw shall be opened promptly upon reasonable signal for the passage of boats; and whatever kind of bridge is built, the said company shall maintain thereon, from sunset to sunrise, such lights or other signals as the Light-House Board shall prescribe. That all railway companies desiring to use said bridge shall have and be entitled to equal rights and privileges in the passage of the same, and in the use of the machinery and fixtures thereof, and of all approaches thereto, under and upon such terms and conditions as shall be prescribed by the Secretary of War upon hearing the allegations and proofs of the parties, in case they shall not agree.

Secretary of  
War to ap-  
prove plans,  
etc.

Changes.

*Provided.*  
Opening  
draw.

Lights, etc.

Use by other  
roads.

**SEC. 3.** That any bridge built under this Act and subject to its limitations shall be a lawful structure and shall be recognized and known as a post route, upon which no higher charge shall be made for transmission over the

Lawful  
structure and  
post route.

Telegraph, etc., rights. same of the mails, the troops, and the munitions of war of the United States than the rate per mile paid for the transportation over the railroad or public highways leading to the said bridge; and it shall enjoy the rights and privileges of other post-roads of the United States, and the United States shall have the right of way across said bridge for postal, telegraph, and telephone purposes; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies.

Toll. SEC. 4. That the rates of toll which shall be charged for vehicles and foot passengers over said bridge shall be the same as those now established for like service by the laws of Arkansas as expressed in section fifty-five hundred and forty-six of Mansfield's Digest thereof, eighteen hundred and eighty-four, page one thousand and sixty-eight.

Amendment. SEC. 5. That the right to alter, amend, or repeal this Act, or any part thereof, whenever Congress shall consider it necessary for the public interest, is hereby expressly reserved, and any expenditure required by reason of such legislation by Congress shall be made by the owners of said bridge or the corporation or parties controlling and using the same, without cost or damage to the United States.

Time of construction. SEC. 6. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date of approval of this Act.

Approved, February 6, 1905.

Feb. 7, 1905. Vol. 33, p. 700. CHAP. 546.—An Act To authorize The Decatur Transportation and Manufacturing Company, a corporation, to construct, maintain, and operate a bridge across the Tennessee River at or near the city of Decatur, Alabama.  
[H. R. 16567.]  
[Public, No. 48.]

Tennessee River. The Decatur Transportation and Manufacturing Company may bridge, at Decatur, Ala. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That The Decatur Transportation and Manufacturing Company, a corporation organized under the laws of the State of Alabama, its successors and assigns, are hereby authorized and empowered to erect, establish, maintain, and operate a railway and road or highway bridge across the Tennessee River at such point or place at or near the city of Decatur, Alabama, as may be by said company selected and approved by the Secretary of War; and if said bridge, erected and maintained under the authority of this Act, shall at any time unreasonably obstruct the free navigation of said river, or shall in the opinion of the Secretary of War unreasonably obstruct such navigation, he is hereby authorized to cause such change or alteration of said bridge to be made as will effectually obviate such obstruction; and such alteration

Obstruction to navigation.

Changes.

shall be made and all such obstructions be removed at the expense of the owners or operators of said bridge; and in case of any litigation arising from any obstruction or alleged obstruction to free navigation of said river by reason of the construction of said bridge, the same shall be instituted and determined in the district court of the United States for the northern division of the northern district of Alabama: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the navigation of rivers, or to exempt this bridge from the operation of the same.

Litigation.

*Provido.*  
Existing  
laws not af-  
fected.

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built subject to such regulations for security of navigation of said river as the Secretary of War shall prescribe; and to secure that object the said company shall submit to the Secretary of War, for his examination and approval, a general design and drawing of said bridge and a map of the location, giving, for the space of one mile above and one mile below the proposed location, the topography of the banks of the river, the shore lines at high and low water, soundings showing the bed of the stream, and such other information as the Secretary of War may require for a full and satisfactory understanding of the subject; and until the plan and location of the bridge are approved by the Secretary of War the construction of said bridge shall not be commenced.

Secretary of  
War to ap-  
prove plans,  
etc.

SEC. 3. That a draw shall be made and maintained in such bridge, which said draw shall be opened promptly upon reasonable signal for the passing of boats; and such lights or signals as the Light-House Board shall prescribe shall be displayed from sunset until sunrise on said bridge by the owners or operators thereof at their own expense.

Opening  
draw.

Lights, etc.

SEC. 4. That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same, and over the approaches thereto, upon payment of a reasonable compensation for such use; and in case of disagreement between the parties in regard to the compensation to be paid or the conditions to be observed, all matters at issue shall be determined by the Secretary of War.

Use by other  
roads.Compensa-  
tion.

SEC. 5. That the bridge to be built under this Act and according to its limitations shall be held to be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for transportation over the same of the mails, troops, and munitions of war of the United States than the rate per mile paid for their transportation over the railroad or other medium of conveyance leading to such bridge; and it shall enjoy the right and privileges of other post-roads in the United States; and the United States shall have the right of way across said bridge and its approaches

Lawful  
structure and  
post route.

Telegraph, etc., rights. for postal-telegraph purposes; and all telegraph and telephone companies shall have equal rights and privileges in constructing and maintaining their lines across said bridge: *Provided*, That if the Decatur Transportation and Manufacturing Company should determine at any time to charge toll for passing over the bridge, a schedule of the charges shall be submitted to the Secretary of War for his approval, reduction, or refusal, and shall not go into effect until approved by him; and if any complaint is made at any time, that the Secretary of War shall have the authority to reduce the toll as in his discretion he sees proper.

*Proviso. Toll.*

Time of construction. SEC. 6. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date of the approval of this Act.

Amendment. SEC. 7. That the right to alter, amend, extend, or repeal this Act, or any of its provisions, is hereby expressly reserved.

Approved, February 7, 1905.

Feb. 7, 1905. Vol. 33, p. 703. **CHAP. 548.**—An Act Authorizing the Kensington and Eastern Railroad Company to construct a bridge across the Calumet River.

[H. R. 17749.]  
[Public, No. 50.]

Calumet River, Ill. Kensington and Eastern Railroad Company may bridge. Drawbridge.

Location. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Kensington and Eastern Railroad Company, a railroad company organized under the laws of the State of Illinois, its successors and assigns, are hereby authorized to construct, maintain, and operate a drawbridge across the Calumet River in the northeast quarter of the northwest quarter of section thirty-six, township thirty-seven north, range fourteen east of the third principal meridian, in Cook County, Illinois, at a point about three hundred and fifty feet south of the north line of the said section, the said point being about eight-tenths of a mile upstream from the bridge of the New York, Chicago and Saint Louis Railroad Company and about two miles below the bridge of the Pittsburg, Fort Wayne and Chicago Railway Company, located near Hegewisch, in the State of Illinois: *Provided*, That such site is suitable, in the judgment of the Secretary of War, to the interests of navigation.

*Proviso. Protection to navigation.*

Opening draw. Lights, etc. SEC. 2. That the draw provided for the bridge herein authorized shall be opened promptly, upon reasonable signals, for the passage of boats, and said corporation shall maintain, at its own expense, from sunset to sunrise, such lights or other signals on said bridge as the Light-House Board shall prescribe. The said company shall submit to the Secretary of War for his approval, designs and drawings of the said bridge and a map of the location thereof, giving sufficient information to enable him to

Secretary of War to approve plans, etc.



fully and satisfactorily understand the subject; and until the said plans and location are approved by the Secretary of War the bridge shall not be commenced or built. Any change made in the plan of the said bridge during the progress of its construction or after its completion shall be subject to the approval of the Secretary of War, and said company shall, at its own expense, make such changes in the said bridge as the Secretary of War may at any time direct in the interest of navigation.

Changes.

SEC. 3. That any bridge built under this Act and subject to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which no higher charge shall be made for the transmission of mails and the troops and munitions of war of the United States over the same than the rate per mile paid for the transportation over the railroad or approaches leading to the said bridge; and it shall enjoy the rights and privileges of other post-roads in the United States; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal telegraph and telephone purposes.

Lawful structure and post route.

Telegraph, etc., rights.

SEC. 4. That all railroad companies desiring the use of the said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same and over the approaches thereto upon the payment of reasonable compensation for such use; and in case the owner or owners of said bridge and the several railroad companies, or any one of them, desiring such use shall fail to agree upon the sum or sums to be paid and upon rules and conditions to which each shall conform in using said bridge, all matters in issue between them shall be decided by the Secretary of War upon the hearing of the allegations and proofs of the parties.

Use by other companies.

Compensation.

SEC. 5. That the right to alter, amend, or repeal this Act is expressly reserved; and this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the approval of this Act.

Amendment.

Time of construction.

Approved, February 7, 1905.

**CHAP. 555.**—An Act To amend an Act entitled "An Act to authorize W. Denny and Company to bridge Dog River, in the State of Mississippi."

Feb. 8, 1905.  
Vol. 33, p. 708.

[H. R. 17789.]  
[Public, No. 57.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That W. Denny and Company, a corporation of the State of Mississippi, its successors and assigns, be, and is hereby, authorized to construct and maintain the bridge mentioned in the Act approved April eleventh, nineteen hundred and four, entitled "An Act to authorize W.

Dog River, Miss.

Time extended for bridging, by W. Denny & Co.

Vol. 33, p. 170, amended. *Proviso.* Denny and Company to bridge Dog River, in the State of Mississippi," under and subject to the provisions of said Act: *Provided*, That the actual construction of the bridge therein authorized be commenced within one year and completed within three years from the date of approval of this Act.

Time of construction.

Approved, February 8, 1905.

Feb. 9, 1905. Vol. 33, p. 710. **CHAP. 563.**—An Act To confirm title to lot five, in square south of square numbered nine hundred and ninety, in Washington, District of Columbia.  
[S. 6375.]  
[Public, No. 62.]

District of Columbia. Lot 5, in square south of square 990. Title confirmed to occupants of.

Proof of occupancy required.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Secretary of War be, and he is hereby, authorized and directed to correct the records of the War Department in respect to lot five, in square south of square numbered nine hundred and ninety, mentioned in Senate Document Numbered Thirty-one, Fifty-sixth Congress, second session (being a resolution of the Senate of January twenty-seventh, eighteen hundred and ninety-eight, a letter from the Chief of Engineers, together with list of lots in the city of Washington, District of Columbia, the title to which the records of his office show to be in the United States), upon the filing by the actual occupants of the lot mentioned in said document sufficient proof that the said occupants or the party under whom they claim have been in actual possession of the said lot for an uninterrupted period of twenty years, so that the records shall show the title to said lot to be in the said occupants.

Approved, February 9, 1905.

Feb. 9, 1905. Vol. 33, p. 711. **CHAP. 565.**—An Act To authorize the construction of a bridge across the Missouri River between Lyman County and Brule County, in the State of South Dakota.  
[S. 6834.]  
[Public, No. 64.]

Missouri River. White River Valley Railway Company may bridge, at Chamberlain, S. Dak. Pontoon, etc., railroad bridge.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the White River Valley Railway Company, its successors and assigns, be, and are hereby, authorized to construct and maintain a pontoon and pile railroad bridge, and approaches thereto, across the Missouri River, extending from some convenient and practicable point to be selected on the west bank of said river in the county of Lyman and some convenient and practicable point in or near the city of Chamberlain, in Brule County, in the State of South Dakota, said bridge to be constructed so as to provide for the passage of railroad trains, engines, and cars.



SEC. 2. That said bridge shall be constructed as a pontoon and pile bridge and shall contain one pontoon draw span not less than three hundred feet in length in the clear, which draw span shall be maintained over the main channel of said river at an accessible and navigable point, and the remaining portion of said bridge may be constructed as a pile bridge; and said bridge shall be at right angles to the current of the river: *Provided*, That said draw shall be opened promptly by said company upon reasonable signal for the passage of boats and it shall maintain, at its own expense, from sunset to sunrise, such lights or other signals on said bridge as the Light-House Board shall prescribe.

Draw span.

*Provido.*  
Opening  
draw.

Lights, etc.

SEC. 3. That the bridge constructed according to the provisions of this Act shall be a lawful structure, and the same is hereby declared to be a post route, and no higher charge shall be made for the transportation of the mails, the troops and munitions of war of the United States over the same, or for passengers or freight passing over said bridge, than the rate per mile paid for their transportation over the railroads and public highways leading to said bridge; and the United States shall have the right of way across said bridge and its approaches for postal, telegraph, and telephone purposes, and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies.

Lawful struc-  
ture and post  
route.

Telegraph,  
etc., rights.

Use by other  
roads.

SEC. 4. That all railway companies desiring to use said bridge shall have and be entitled to equal rights and privileges in the passage over the same and in the use thereof and of the approaches thereto under and upon such terms and conditions as shall be prescribed by the Secretary of War, upon hearing the allegations and proofs of the parties in case they shall not agree.

SEC. 5. That the bridge herein authorized shall be located and constructed under and subject to such regulations for the security of the navigation of said river as the Secretary of War shall prescribe, and said company shall submit to the Secretary of War, for his examination and approval, a design and drawings showing the plan of said bridge and a map of the location giving for the space of one mile above and one mile below the proposed location, the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the current, and the soundings, accurately showing the bed of the stream, the location of any other bridge in that vicinity, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until said plan and location are approved by the Secretary of War the said bridge shall not be commenced or built; and should any change be made in the plan of said bridge during the progress of construction or after completion such change shall also be subject to the approval of the Secretary of

Secretary of  
War to approve  
plans, etc.

Changes.

Unobstructed  
navigation.

Litigation.

Proviso.  
Existing laws  
not affected.

Time of con-  
struction.

Amendment.

War; and the said bridge shall at all times be so kept and maintained as to afford reasonable and proper means for the passage of vessels through the same, and whenever the said bridge shall, in the opinion of the Secretary of War, unreasonably obstruct the navigation of said river he is hereby authorized to cause the removal thereof or such changes and alterations therein as may be required to preserve the free and convenient navigation of said river, and such removal or such alterations shall be at the cost and expense of the owners thereof; and in case of any litigation arising from the obstruction by said bridge to the free navigation of said river, or for the purpose of compelling the removal or any alterations thereof, as hereinbefore provided, the same may be had in the district court of the United States for the district of South Dakota, in whose jurisdiction said bridge is located: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of the law now existing in reference to the protection of the navigation of rivers or to exempt this bridge from the operations of the same.

SEC. 6. That this Act shall be null and void if the actual construction of the bridge herein authorized shall not be commenced within one year and completed within three years from the date this Act takes effect.

SEC. 7. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 9, 1905.

Feb. 9, 1905. **CHAP. 566.**—An Act Granting to the Keokuk and Hamilton  
Vol. 33, p. 712. Water Power Company rights to construct and maintain for the  
[H. R. 15284.] improvement of navigation and development of water power a  
[Public, No. dam across the Mississippi River.  
65.]

Mississippi  
River.  
Keokuk and  
Hamilton Wa-  
ter Power Com-  
pany may dam,  
at Des Moines  
Rapids, Iowa.

Provisos.  
Construction  
of lock and dry  
dock, etc.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the assent of Congress is hereby given to the Keokuk and Hamilton Water Power Company, a corporation created and organized under the laws of the State of Illinois, its successors, and assigns, to erect, construct, operate, and maintain a dam, with its crest at an elevation of from thirty to thirty-five feet above standard low water, across the Mississippi River at or near the foot of the Des Moines Rapids, from Keokuk, Iowa, to Hamilton, Illinois, and to construct, operate, and maintain power stations on or in connection with the said dam, with suitable accessories for the development of water power, and the generation, use, and transmission therefrom of electric energy and power to be derived from the Des Moines Rapids on the Mississippi River: *Provided*, That in lieu of the three locks and the dry dock, with their appurtenances, now owned and operated by the United States, at

the Des Moines Rapids Canal, the said Keokuk and Hamilton Water Power Company shall build, coincidentally with the construction of the said dam and appurtenances, at locations approved by the Secretary of War, a lock and dry dock with their appurtenances; the said lock shall be of such a kind and size and shall have such appurtenances and equipment as shall conveniently and safely accommodate the present and prospective commerce of the Mississippi River; the said dry dock and its appurtenances shall be such as to give space, facilities, and conveniences for the repair of vessels at least equal to those afforded by the existing Government dry dock and shops at the Des Moines Rapids Canal: *And provided further*, That the said dam and appurtenant works shall be so designed, located, constructed, maintained, and operated, and the said lock and dry dock, with their appurtenances, shall be so designed, located, constructed and equipped, as to permit at all times during the season of navigation, and at any stage of water, the safe and convenient navigation of steamboats and other vessels, or of rafts and barges, through the portion of the Mississippi River now occupied by the Des Moines Rapids, as well as through the entire length of the pool formed by the said dam: *And provided further*, That detailed plans for the construction and operation of the said dam, lock, dry dock, and appurtenant works, shall be submitted to and approved by the Secretary of War before the commencement of any portion of the said works; and the said works shall be constructed under the supervision of some engineer officer of the Army designated for that purpose, and that after the approval of the said plans no deviation therefrom shall be made without the prior approval of the Secretary of War of any such deviation: *And provided further*, That compensation shall be made by the said Keokuk and Hamilton Water Power Company to all persons, firms, or corporations whose lands or other property may be taken, overflowed, or otherwise damaged by the construction, maintenance, and operation of the said works in accordance with the laws of the State where such lands or other property may be situated; but the United States shall not be held to have incurred any liability for such damages by the passage of this Act: *And provided further*, That when the said dam, lock, dry dock, and appurtenant works shall have been completed to the satisfaction of the Secretary of War, the United States shall have the ownership and control of the said lock, dry dock, and their appurtenances, and operate and maintain the same.

Restrictions.

Unobstructed navigation.

Secretary of War to approve plans, etc.

Supervision of engineer officer, etc.

Compensation for damages.

Nonliability of the United States.

Operation of lock and dry dock.

Protection to navigation.

SEC. 2. That the withdrawal of water from the Mississippi River and the discharge of water into the said river, for the purpose of operating the said power stations and appurtenant works, shall be under the direction and control of the Secretary of War, and shall at no time be such

as to impede or interfere with the safe and convenient navigation of the said river by means of steamboats or other vessels, or by rafts or barges: *Provided*, That the said company shall construct such suitable fishways as may be required from time to time by the Secretary of Commerce and Labor.

*Proviso.*  
*Fishways.*

*Cost of construction, etc.*

*Provisos*  
*Cost of supervision.*  
*Ante, p. 1065.*

*Power plant.*

*Repeal of former act.*  
*Vol. 81, p. 764.*

*Time of construction.*

*Amendment.*

SEC. 3. That, except as provided for below in this section, the Keokuk and Hamilton Water Power Company shall bear the entire cost of locating, constructing, maintaining, and operating the structures and appurtenances provided for in this Act: *Provided*, That the United States shall bear the cost of the supervision of the work by an engineer officer of the Army as provided for in section one of this Act, and also the cost of maintaining and operating the lock and dry dock with their appurtenances, after their completion and due acceptance by the Secretary of War on behalf of the United States: *And provided further*, That the Keokuk and Hamilton Water Power Company shall provide, in connection with such lock, dry dock, and appurtenances, a suitable power plant for operating and lighting the same, according to plans and specifications submitted to and approved by the Secretary of War.

SEC. 4. That the Act entitled "An Act granting to the Keokuk and Hamilton Water Power Company right to construct and maintain wing dam, canal, and power station in the Mississippi River in Hancock County, Illinois," approved February eighth, nineteen hundred and one, is hereby repealed.

SEC. 5. That this Act shall be null and void if actual construction of the works herein authorized be not commenced within five years and completed within ten years from the date hereof.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 9, 1905.

Feb. 9, 1905.  
Vol. 33, p. 714.  
[S. 6312.]  
[Public, No. 66.]

*Irrigation.*  
*Little Klamath, Rhett, and Goose lakes, etc., Oreg. and Cal.*  
*Levels may be raised, etc.*  
*Vol. 32, p. 388.*

**CHAP. 567.**—An Act Authorizing the changing of the levels of certain lakes and the disposal of certain lands under the terms of the national reclamation Act.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Secretary of the Interior is hereby authorized in carrying out any irrigation project that may be undertaken by him under the terms and conditions of the national reclamation Act and which may involve the changing of the levels of Lower or Little Klamath Lake, Tule or Rhett Lake, and Goose Lake, or any river or other body of water connected therewith, in the States of

Oregon and California, to raise or lower the level of said lakes as may be necessary and to dispose of any lands which may come into the possession of the United States as a result thereof by cession of any State or otherwise under the terms and conditions of the national reclamation Act.

Approved, February 9, 1905.

**CHAP. 568.**—An Act For the relief of the Gull River Lumber Company, its assigns or successors in interest.

Feb. 9, 1905.  
Vol. 33, pt. 2,  
p. 1832.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of War be, and he is hereby, authorized and directed to execute, acknowledge, and deliver, in the name of the United States of America, to the Gull River Lumber Company, its assigns or successors in interest, a deed of quitclaim and release, quitclaiming and releasing all the right, title, and interest of the United States of America in and to the following real property, lying and being in the county of Cass, in the State of Minnesota, and described as follows: Lots one, two, three, four, and five of section twenty, in township one hundred and thirty-five north, of range twenty-nine west.

[H. R. 14351.]  
[Private, No. 502.]

Gull River  
Lumber Com-  
pany.

Certain Gull  
Lake reservoir  
lands in Min-  
nesota quit-  
claimed to.

Description.

Approved, February 9, 1905.

**CHAP. 572.**—An Act To amend an Act entitled "An Act authorizing the Winnipeg, Yankton and Gulf Railroad Company to construct a combined railroad, wagon, and foot-passenger bridge across the Missouri River at or near the city of Yankton, South Dakota."

Feb. 11, 1905.  
Vol. 33, p. 715.

[S. 6450.]  
[Public, No. 68.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section six of "An Act authorizing the Winnipeg, Yankton and Gulf Railroad Company to construct a combined railroad, wagon, and foot-passenger bridge across the Missouri River at or near the city of Yankton, South Dakota," approved April fifth, nineteen hundred and four, be, and the same is hereby, so amended that the time within which the said bridge is required to be commenced shall be within one year and the time within which it is required that said bridge shall be completed shall be within three years from the date of the approval of this Act.

Missouri  
River.

Time ex-  
tended for  
bridging, by  
Winnipeg,  
Yankton and  
Gulf Railroad  
Company at  
Yankton, S.  
Dak.  
Vol. 33, p. 157.

Approved, February 11, 1905.



Feb. 15, 1905. **CHAP. 574.**—An Act Declaring Grand River to be not a navigable stream.  
Vol. 33, p. 715.

[H. R. 17350.]  
[Public, No. 69.]

Grand River.  
Not navigable above Brunswick, Mo.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That Grand River in the State of Missouri above the city of Brunswick, in the county of Chariton in said State, is hereby declared to be not a navigable stream and shall be so treated by the Secretary of War and by all other authorities.

Approved, February 15, 1905.

Feb. 15, 1905.  
Vol. 33, p. 715.

[H. R. 18207.]  
[Public, No. 70.]

Missouri River.  
Lexington Suburban Railway Company may bridge, at Lexington, Mo.  
Vol. 33, p. 528.

Use extended to steam roads.  
Vol. 33, p. 528, amended.

Provisions.  
Aids to navigation.

Lights, etc.

**CHAP. 575.**—An Act To amend sections one, five, and six of an Act entitled "An Act authorizing the construction of a wagon, toll, and electric-railway bridge over the Missouri River, at Lexington, Missouri," approved April twenty-eighth, nineteen hundred and four, extending the provisions thereof to steam-railway cars, locomotives, and other motive power, and extending the time for commencing actual construction of said bridge.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That sections one, five, and six of an Act entitled "An Act authorizing the construction of a wagon, toll, and electric-railway bridge over the Missouri River, at Lexington, Missouri," approved April twenty-eighth, nineteen hundred and four, be amended to read as follows:

**SECTION 1.** That the Lexington Suburban Railway Company, duly incorporated under the laws of Missouri, is hereby authorized to construct and maintain a bridge and approaches thereto across the Missouri River, between the city of Lexington, Missouri, and Ray County, Missouri, at a point to be selected consistent with the interests of navigation. Said bridge shall be constructed to provide for the passage of railway trains, whether operated by steam, electricity, or other motive power, and for the passage of wagons and vehicles of all kinds, street-railway cars, animals, foot passengers, and for all road travel for such reasonable rates of toll and under such reasonable rules and regulations as may be prescribed by the said company when approved from time to time by the Secretary of War: *Provided*, That the said company, or its successors and assigns, shall build and maintain at all times, as accessory works to said bridge, such booms, piers, dikes, guard fences, and similar devices as may be necessary, in the judgment of the Secretary of War, to insure at all times a permanent channel for a sufficient distance above and below the bridge site, and for the guiding of rafts, steamboats, and other water craft safely under said bridge: *Provided further*, That the said company, or its successors and assigns, shall maintain on said bridge, from sunset to sunrise, such lights and other

signals as the Light-House Board shall prescribe: *And provided further*, That all railway companies and all street-railway companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains, street-railway trains and cars over the same, and over approaches thereto, upon payment of a reasonable compensation for such use, and in case of disagreement, upon such terms and conditions as shall be prescribed by the Secretary of War upon hearing the allegations and proofs of the parties in interest.

Use by other roads.

Compensation

“Sec. 5. That any bridge built under this Act and subject to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same of the mails, the troops, and the munitions of war of the United States than the rate per mile paid for the transportation over the railway, street railways, or public highways leading to said bridge, and it shall enjoy the rights and privileges of other post-roads in the United States; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal-telegraph purposes.

Lawful structure and post route.

Charges.  
Vol. 33, p. 529, amended.

“Sec. 6. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from April twenty-eighth, nineteen hundred and five, and the right to alter, amend, or repeal this Act is hereby expressly reserved.”

Time of construction extended.

Vol. 33, p. 529, amended.  
Amendment.

Approved, February 15, 1905.

**CHAP. 577.**—An Act For the relief of Edward J. Farrell.

Feb. 15, 1905.  
Vol. 33, pt. 2, p. 1833.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Secretary of War be, and he is hereby, authorized and directed to execute, acknowledge, and deliver, in the name of the United States of America, to Edward J. Farrell, a deed of quitclaim and release quitclaiming and releasing to said Edward J. Farrell, his heirs and assigns, all the right, title, and interest of the United States of America in and to the following-described land, under water, in the city of New York and State of New York, namely: Beginning at a point in the northerly line of the Croton Aqueduct appropriation, where the same is intersected by the easterly side of lands taken by the United States Government for the improvement of the Harlem River, and running thence northerly along said easterly side of said lands taken by the United

[H. R. 10516.]  
[Private, No. 506.]

Edward J. Farrell.

Certain land acquired in connection with Harlem River improvement quit-claimed to.

Description.



*Proviso.*  
*Proof* of  
ownership.

States Government for the improvement of the Harlem River one hundred and seven and eighty-seven one-hundredths feet to the lands of the estate of William B. Ogden; thence westerly along the lands formerly of the estate of William B. Ogden fifteen and forty-five one-hundredths feet to the pier and bulkhead line established by the United States Government in eighteen hundred and ninety; thence southerly along said last-mentioned line one hundred and eight and forty-three one-hundredths feet to the lands formerly of the Croton Aqueduct appropriation; thence easterly along said lands nine and fifty-nine one-hundredths feet to the point or place of beginning: *Provided*, That the said Edward J. Farrell shall show, by proof satisfactory to the Secretary of War, that he is the owner of the abutting shore.

Approved, February 15, 1905.

Feb. 16, 1905. **CHAP. 579.**—An Act To authorize the Leckrone and Little  
Vol. 33, p. 717. Whiteley Railroad Company to construct and maintain a bridge  
[H. R. 18428.] across the Monongahela River.  
[Public, No.  
73.]

Monongahela  
River.  
Leckrone and  
Little Whiteley  
Railroad Com-  
pany may  
bridge.

Location.

Secretary of  
War to approve  
plans, etc.

Notification.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Leckrone and Little Whiteley Railroad Company, a corporation existing under the laws of the State of Pennsylvania, is hereby authorized to construct, maintain, and operate a railroad bridge, with single or double track, for railroad traffic across the Monongahela River, on the boundary line between Fayette and Greene counties, State of Pennsylvania, the easterly end of said bridge to be located at some point in German Township, Fayette County, and the westerly end at some point in Cumberland Township, Greene County. The said bridge, when built in accordance with the requirements of this Act, shall be a legal structure, and may be used for railroad and highway purposes.

**SEC. 2.** That the bridge authorized to be constructed under this Act shall be located and built under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the railroad company shall submit to the Secretary of War, for his examination and approval, a design and drawing of the bridge and a map of the location, giving for the space of one mile above and below the proposed location the depth and currents at all points of the same and the location of any other bridge or bridges, together with all other information touching said bridge and river as may be deemed requisite by the Secretary of War to determine whether said bridge when built will conform to the provisions of this Act, and cause any serious obstruction to the navigation of the river or injuriously affect the flow of water.

**SEC. 3.** That the Secretary of War is hereby authorized

and directed, upon receiving said plan and map and upon being satisfied that a bridge built on such a plan and at said locality will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water, to notify the said company that he approves the same, and upon receiving such notification the said company may proceed to the erection of said bridge, conforming strictly to the approved plan and location. But until the Secretary of War shall approve the plan and location of the said bridge and notify the said company of the same in writing, the bridge shall not be built or commenced, and should any change be made in the plan of the bridge during the progress of the work thereon, such change shall be subject likewise to the approval of the Secretary of War.

Changes.

SEC. 4. That said bridge shall be constructed to provide for the passage of railroad trains, and, at the option of the corporation by which it may be built, may be used for the passage of wagons, passenger cars, electric motors, and vehicles of all kinds, for the transit of animals and for foot passengers and all kinds of common travel or communication, for such reasonable rates of toll as may be approved from time to time by the Secretary of War.

Railroad,  
wagon, etc.,  
bridge.

Toll.

SEC. 5. That all railroad companies desiring the use of any bridge constructed under this Act shall have and be entitled to equal rights and privileges relative to the passage of railway trains or cars over the same, and over the approaches thereto, upon payment of reasonable compensation for such use; and in case the owner or owners of said bridge and the several railroad companies, or any of them, desiring such use shall fail to agree upon the sum or sums to be paid and upon the rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies.

Use by other  
roads.Telegraph.  
etc., rights.

SEC. 6. That any bridge constructed under this Act shall be a lawful structure, and shall be known as a post-road, over which no higher charge shall be made for the transportation of mails, troops, and munitions of war, or other property of the Government of the United States, or for passengers or freight passing over the same, than the rate per mile charged for their transportation over the railways or public highways leading to said bridge. The United States shall also have the right of way over said bridge for postal-telegraph and telephone purposes.

Lawful struc-  
ture and post  
route.

SEC. 7. That said bridge herein authorized to be constructed shall be so kept and managed at all times as to afford proper means and ways for the passage of vessels, barges, or rafts, both by day and by night, and there shall

Lights, etc.

be displayed on said bridge by the owners thereof, from sunset to sunrise, such lights or other signals as the Light-House Board may prescribe, and such changes shall be made from time to time in the structure of said bridge as the Secretary of War may direct, at the expense of the said company, in order the more effectually to preserve the free navigation of said river.

Time of construction.

SEC. 8. That this Act shall be null and void unless the construction of said bridge shall be commenced within one year and completed within three years from the passage of this Act.

Amendment.

SEC. 9. That Congress shall have power at any time to alter, amend, or repeal this Act.

Approved, February 16, 1905.

Feb. 18, 1905.  
Vol. 33, p. 720.

[S. 6951.]  
[Public, No. 80.]

**CHAP. 587.**—An Act To authorize the Spokane International Railway Company to construct and maintain bridges across the Pend d'Oreille River and the Kootenai River in the county of Kootenai, State of Idaho.

Pend Oreille  
and Kootenai  
rivers, Idaho.  
Spokane In-  
ternational  
Railway Com-  
pany may  
bridge.

Locations.

Lawful  
structures and  
post routes.

Telegraph,  
etc., rights.

Use by other  
roads.

Compensa-  
tion.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Spokane International Railway Company, a corporation organized under the laws of the State of Washington, be, and is hereby, authorized and empowered to construct, maintain, and operate one bridge across each of the following-named rivers in the county of Kootenai, State of Idaho: The Pend d'Oreille River, at a point between Pend d'Oreille Lake and Seneaguoteen; the Kootenai River, at a point at or near the town of Bonners Ferry; and to lay railroad tracks on the said bridges, and to operate trains thereon as a part of its railroad.

SEC. 2. That any bridges built under this Act and subject to its limitations shall be lawful structures, and shall be recognized and known as post routes, upon which also no higher charge shall be made for the transportation over the same of the mails, troops, and munitions of war of the United States than the rate per mile paid for transportation of said mails, troops, and munitions of war over public highways leading to said bridges; and equal privileges in the use of said bridges shall be granted to all telegraph and telephone companies; and the United States shall have the right of way across said bridges and their approaches for postal-telegraph purposes.

SEC. 3. That all railroad companies desiring the use of said bridges shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same, and over the approaches thereto, upon the payment of a reasonable compensation for such use; and in case the owner or owners of said bridges and the several railroad companies, or any of them, desiring such use shall fail to agree upon the sum or sums to be paid and upon the rules and conditions to which each shall conform in using said bridges, all matters at issue between them

shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties.

SEC. 4. That all bridges authorized to be constructed under this Act shall be built under and subject to such regulations for the security of the navigation of said rivers as the Secretary of War shall prescribe, and to secure that object the said company or corporation shall submit to the Secretary of War, for his examination and approval, maps of location and designs and drawings of each of the bridges; and until the said plans and locations are approved by the Secretary of War the bridges shall not be commenced or built; and should any changes be made in the plans of said bridges, or any one of them, during the progress or construction or after completion, such changes shall be subject to the approval of the Secretary of War, and all changes in said bridges, or any one of them, required by the Secretary of War, at any time, or their entire removal, shall be made promptly by the corporations or persons owning or operating said bridges, at their own expense.

Secretary of War to approve plans, etc.

Changes.

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

SEC. 6. That this Act shall be null and void if actual construction of the bridges herein authorized is not commenced within one year and completed within three years from the date thereof.

Time of construction.

Approved, February 18, 1905.

**CHAP. 588.**—An Act To grant certain lands to the State of Ohio.

Feb. 18, 1905.  
Vol. 33, p. 721.

[H. R. 11444.]  
[Public, No. 81.]  
Preamble.

Whereas the State of Ohio in the years eighteen hundred and twenty-eight to eighteen hundred and forty-four, inclusive, constructed the Miami and Erie Canal; and Whereas the State of Ohio, for the purpose of supplying the said canal with water, built and constructed certain artificial lakes or reservoirs known as the Mercer County Reservoir, in Mercer and Auglaize counties, and the Loramie Reservoir, in Auglaize and Shelby counties, the former being completed and flooded with water about the year eighteen hundred and forty-two, and the latter about the year eighteen hundred and forty-four; and

Whereas it has recently come to the knowledge of the authorities of the State of Ohio that the title to the land above described is in the United States and not in the said State of Ohio: Therefore,

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following-described lands in township six south, range three east, in Mercer County, Ohio, be, and the same are hereby, granted to the State of Ohio, to wit: The southeast quarter of the southeast quarter of section

Ohio.  
Lands in Mercer, Auglaize, and Shelby counties, granted to.  
Description.

two, township six south, range three east, forty acres; the south half of the southwest quarter of section three, township six south, range three east, eighty acres; the east half of the northeast quarter of section eight, township six south, range three east, eighty acres; the southwest quarter of the northeast quarter of section eight, township six south, range three east, forty acres; the northwest quarter of section eight, township six south, range three east, one hundred and sixty acres; the southwest quarter of section eight, township six south, range three east, one hundred and sixty acres; the northeast quarter of section nine, township six south, range three east, one hundred and sixty acres; the southeast quarter of section nine, township six south, range three east, one hundred and sixty acres; the northwest quarter of section nine, township six south, range three east, one hundred and sixty acres; the east half of the southwest quarter of section nine, township six south, range three east, eighty acres; the southwest quarter of section ten, township six south, range three east, one hundred and sixty acres; the northeast quarter of section eleven, township six south, range three east, one hundred and sixty acres; the southeast quarter of section eleven, township six south, range three east, one hundred and sixty acres; the east half of the southwest quarter of section eleven, township six south, range three east, eighty acres; the northwest quarter of section seventeen, township six south, range three east, one hundred and sixty acres; the east half of the southwest quarter of section seventeen, township six south, range three east, eighty acres; also the whole of section seven, township six south, range four east, in Auglaize County, Ohio, six hundred and ninety-four acres; also the north half of the southwest quarter of section twenty-seven, township seven south, range five east, in Shelby County, Ohio, eighty acres; and containing in all two thousand six hundred and ninety-four acres, more or less.

Approved, February 18, 1905.

Feb. 18, 1905. **CHAP. 589.**—An Act Authorizing the Alexandria, Bayou Maçon and Greenville Railway Company to construct bridges over Red River, Little River, Ouachita River, and Bayou Louis, in Louisiana.  
[H. R. 17481.]  
[Public, No. 82.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Alexandria, Bayou Maçon and Greenville Railway Company, a corporation created and organized under the laws of the State of Louisiana, be, and the same is hereby, authorized to construct and maintain, for the passage of railway trains, bridges with single or double tracks and approaches thereto over the Red River, the Little River, the Ouachita River, and Bayou Louis, in

Red, Little, Ouachita Rivers, and Bayou Louis, La. Alexandria, Bayou Maçon and Greenville Railway Company may bridge. Locations.



the State of Louisiana, at such locations as may be approved by the Secretary of War.

SEC. 2. That the said bridges shall be located and built under and subject to such regulations for the security of navigation as shall be prescribed by the Secretary of War, and the said company shall submit to the Secretary of War, for his examination and approval, designs and drawings of the bridges and maps of the locations, giving for the space of a mile above and a mile below the proposed locations the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the current at all stages, the soundings accurately showing the bed of the stream; and until the plans and locations have been approved by the Secretary of War the bridges shall not be built or commenced. The Secretary of War shall have power to require such other information as he may deem necessary for a full understanding of the subject. Any changes made in the plans of said bridges during the progress of construction or after completion shall be subject to the approval of the Secretary of War, and the said company shall, at its own expense, make such changes in said bridges as the Secretary of War may at any time direct in the interest of navigation.

Secretary of War to approve plans, etc.

Changes.

SEC. 3. That any bridge built under this Act and subject to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which no higher charge shall be made for the transmission of mails and the troops and munitions of war of the United States over the same than the rate per mile paid for the transportation over the railroad or approaches leading to the said bridge; and it shall enjoy the rights and privileges of other post-roads in the United States, and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridges and their approaches for postal telegraph and telephone purposes.

Lawful structures and post routes.

Telegraph, etc., rights.

SEC. 4. That each of the said bridges shall be constructed with its center line substantially at right angles to the current of the river and as a drawbridge, so that a free and unobstructed passageway may be secured to all water craft navigating said river. The draws shall be opened promptly, upon reasonable signals, for the passage of boats or vessels, and the said company shall maintain at its own expense, from sunset to sunrise, such lights or other signals as the Light-House Board shall prescribe.

Unobstructed navigation.

Lights, etc.

SEC. 5. That all railroad companies desiring the use of the said bridges shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same and over the approaches thereto, upon the payment of reasonable compensation for such use; and in case the owner or owners of said bridges, and the sev-

Use by other roads.

Compensation.

eral railroad companies, or any one of them, desiring such use, shall fail to agree upon the sum or sums to be paid and upon rules and conditions to which each shall conform in using said bridges, all matters in issue between them shall be decided by the Secretary of War upon the hearing of the allegations and proofs of the parties.

Amendment.  
Time of construction.

SEC. 6. That the right to alter, amend, or repeal this Act is expressly reserved; and this Act shall be null and void if actual construction of the bridges herein authorized be not commenced within one year and completed within three years from the approval of this Act.

Approved, February 18, 1905.

Feb. 18, 1905.  
Vol. 33, p. 1283.

[S. J. R. 65.]  
[Pub. Res., No. 18.]

District of Columbia.

Time extended for building highway bridge across Potomac River.

Vol. 31, p. 772.  
Time of construction.

Vol. 32, p. 598, amended.

[No. 19.] Joint Resolution Providing for an extension of time for completing the highway bridge and approaches across the Potomac River at Washington, District of Columbia.

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled.*

That the time for completing the construction of the highway bridge and approaches across the Potomac River authorized by section twelve of the Act of Congress approved February twelfth, nineteen hundred and one, entitled "An Act to provide for eliminating certain grade crossings on the line of the Baltimore and Potomac Railroad Company, in the city of Washington, District of Columbia, and requiring said company to depress and elevate its tracks, and to enable it to relocate parts of its railroad therein, and for other purposes," as amended by the District of Columbia appropriation Act approved July first, nineteen hundred and two, be, and is hereby, extended to February twelfth, nineteen hundred and six.

Approved, February 18, 1905.

Feb. 20, 1905.  
Vol. 33, p. 723.

[S. 5972.]  
[Public, No. 83.]

Mississippi River.

Sauk Rapids Manufacturing Company may dam, at Sauk Rapids, Minn.

**CHAP. 591.**—An Act Permitting the building of a dam across the Mississippi River between the village of Sauk Rapids, Benton County, Minnesota, and the city of Saint Cloud, Stearns County, Minnesota.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the consent of Congress is hereby granted to the Sauk Rapids Manufacturing Company, a corporation organized under the laws of the State of Minnesota, its successors or assigns, to build a dam across the Mississippi River at the Sauk Rapids, so called, in said river, and between the village of Sauk Rapids, in Benton County, Minnesota, and the city of Saint Cloud, or an addition thereof, in Stearns County, Minnesota, for the development of water power, and such works and structures in connection therewith as may be



necessary or convenient in the development of said power and in the utilization thereof: *Provided*, That the plans for the construction of said dam and appurtenant works shall be submitted to and approved by the Chief of Engineers and the Secretary of War before the construction of the same: *And provided further*, That the said Sauk Rapids Manufacturing Company, its successors or assigns, shall not deviate materially from said plans after such approval, either before or after the completion of said structures, unless the modification of said plans shall have been submitted previously to and received the approval of the Chief of Engineers and of the Secretary of War: *And provided further*, That there shall be placed and maintained in connection with said dam a sluiceway so arranged as to permit logs, timber, and lumber to pass around, through, or over said dam without unreasonable delay or hindrance and without toll or charges: *And provided further*, That said dam shall be so constructed that the Government of the United States may at any time construct in connection therewith a suitable lock for navigation purposes, and may at any time, without compensation, control said dam so far as shall be necessary for purposes of navigation, but shall not destroy or reduce the water power developed by said dam and structures to any greater extent than may be necessary to provide proper facilities for navigation, and the Secretary of War may at any time require and enforce, at the expense of the owners, such modifications and changes in the construction of said dam as he may deem advisable in the interests of navigation: *And provided further*, That suitable fishways, to be approved by the United States Fish Commissioner, shall be constructed and maintained at said dam by said company, its successors or assigns.

*Proviso.*  
Secretary of War to approve plans, etc.

Modification of plans.

Sluiceway.

Aids to navigation.

Changes.

Fishways.

Litigation.

*Proviso.*  
Existing laws not affected.

Time of construction.

Amendment.

SEC. 2. That in case any litigation arises from the building of said dam, or from the obstruction of said river by said dam or appurtenant works, such cases may be tried in the proper courts, as now provided for that purpose in the State of Minnesota and in the courts of the United States: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers, or to exempt said structures from the operation of the same.

SEC. 3. That this Act shall be null and void unless the said dam herein authorized be commenced within one year and be completed within three years from the time of the passage of this Act.

SEC. 4. That the right to amend or repeal this Act is hereby expressly reserved.

Approved, February 20, 1905.

Feb. 23, 1905. **CHAP. 739.**—An Act To amend an Act approved February  
Vol. 33, p. 740. twelfth, nineteen hundred and one, entitled "An Act to provide for  
[S. 6422.] eliminating certain grade crossings on the line of the Baltimore  
[Public, No. and Potomac Railroad Company, in the city of Washington, Dis-  
93.] trict of Columbia, and requiring said company to depress and  
elevate its tracks, and to enable it to relocate parts of its railroad  
therein, and for other purposes."

*Be it enacted by the Senate and House of Representa-  
tives of the United States of America in Congress assem-  
bled,* That section thirteen of the Act approved February  
twelfth, nineteen hundred and one, entitled "An Act to  
provide for eliminating certain grade crossings on the  
line of the Baltimore and Potomac Railroad Company,  
in the city of Washington, District of Columbia, and re-  
quiring said company to depress and elevate its tracks, and  
to enable it to relocate parts of its railroad therein, and for  
other purposes," be, and it is hereby, so amended as to per-  
mit the completion of the work within seven years from  
the date of the passage of said Act; and also further  
amended by adding at the end thereof the following,  
namely:

Modification, "But the said plans and profiles may from time to time,  
etc., of plans. with the approval of the said Commissioners, be modified  
Commission- or changed by the said company, and thereafter the work  
ers to approve. shall be done in accordance with the said modified or  
changed plans and profiles."

\* \* \* \* \*

Approved, February 23, 1905.

Feb. 24, 1905. **CHAP. 777.**—An Act For the allowance of certain claims re-  
Vol. 33, p. 743. ported by the Court of Claims, and for other purposes.

[H. R. 9548.]  
[Public, No. 90.] *Be it enacted by the Senate and House of Representa-  
tives of the United States of America in Congress assem-  
bled,* That the Secretary of the Treasury be, and he is  
hereby, authorized and directed to pay, out of any money  
in the Treasury not otherwise appropriated, to claimants  
in this Act named the several sums appropriated herein,  
the same being in full for and the receipt of the same to  
be taken and accepted in each case as a full and final re-  
lease and discharge of their respective claims, namely:

\* \* \* \* \*

MISCELLANEOUS CASES.

FOR DIRECT APPROPRIATION.

\* \* \* \* \*

James B. To the estate of James B. Eads, the sum of nineteen  
Eads. thousand six hundred and fifty-seven dollars and fifty-  
Payment to four cents, in full payment of the balance of interest due  
estate of, Im- to said estate from the United States.  
proving South  
Pass, Missis-  
sippi River.

\* \* \* \* \*

Independent To the Independent Line Steamers, of Tampa, Florida.  
Line Steamers, the sum of one thousand three hundred and forty-four  
Tampa, Fla.

dollars and eighteen cents, in full settlement of all claims said steamer line may have against the United States for damages to the steamer Manatee, due to a collision with the United States steamer Hillsboro in Tampa Bay, Florida, on the night of November eighteenth, nineteen hundred and one. And so much of the Act of July first, nineteen hundred and two (Thirty-second Statutes at Large, page five hundred and fifty-seven), as authorized the payment of six hundred and twenty-four dollars and eighteen cents to the said Independent Line Steamers is hereby repealed.

Repeal.  
Vol. 32, p.  
557.

FOR INVESTIGATION AND SETTLEMENT.

That the Secretary of War be, and he is hereby, authorized and directed to examine the claim of John Conner, senior, for payment of a sum alleged to be due for twenty and one-tenth acres of cleared land, seven and seventy-one one-hundredths acres of timbered land, five hundred bushels of corn, and twenty bales of cotton, said land and other property alleged to have been taken and appropriated by the United States in constructing a levee at Ashport, Lauderdale County, Tennessee, in eighteen hundred and eighty-six and eighteen hundred and eighty-seven, under the supervision of the Mississippi River Commission, and allow him whatever the said land and other property are reasonably worth, not exceeding the sum of one thousand two hundred and seventy-nine dollars and sixty cents, the amount so allowed to be in full payment for said land and other property alleged to have been taken and appropriated: *Provided*, That none of the said amount shall be paid to the claimant until after he shall have executed and delivered to the proper officer of the Government all papers necessary to give to the United States a title in fee simple to all of the aforementioned land, but nothing in this proviso shall be held to compel claimant to pay any taxes which may have accrued against this land during its occupancy by the Government: *And provided, further*, That the acceptance by the claimant of the amount so allowed shall be considered as full satisfaction of his claim. And whatever sum shall be found due on such examination shall be paid to the said John Conner, senior, and is hereby appropriated out of any money in the Treasury not otherwise appropriated.

For investigation and settlement.

John Conner.  
Land, etc.,  
for levee, Ashport, Tenn.

*Provisos.*

Title in fee simple.

Payment in full.

LIMITATION.

In case of the death of any claimant, or death or discharge of any executor or administrator of any claimant herein named, then payment of such claim as herein pro-

General limitations.

Legal representatives.

*Provisos.* vided shall be made to the legal representatives: *Pro-*  
*Bond from* vided, That where a claimant is dead the administrator,  
*administrator.* executor, or legal representative shall file a certified copy  
of his bond, which bond must be at least equal in amount  
to the sum hereby appropriated: *And provided further.*  
*Next of kin* That in all cases where the original claimants were ad-  
*instead of* judicated bankrupts the payments shall be made to the  
*bankrupts' as-* next of kin instead of to assignees in bankruptcy; \* \* \*  
*signee.* *And provided further,* That wherever under this bill it  
is provided that a payment be made to an executor or an  
*Substitution* administrator, whether original or ancillary or de bonis  
*in case of* non, and such executor or administrator is dead or no  
*death of exec-* longer holds his office, the payment shall be made to the  
*utor, etc.* successor therein, his title to hold such office being estab-  
lished to the satisfaction of the Secretary of the Treasury,  
and whenever under this bill it is provided that a pay-  
*Payment to* ment shall be made to a corporation and such corporation  
*corporations.* has been merged in or consolidated with another corpora-  
tion, payment shall be made to the corporation with  
which the consolidation or merger has been made.

Approved, February 24, 1905.

Feb. 24, 1905. **CHAP. 778.**—An Act To amend an Act approved August thir-  
Vol. 33, p. 811. teenth, eighteen hundred and ninety-four, entitled "An Act for the  
[H. R. 13626.] protection of persons furnishing materials and labor for the con-  
[Public, No. struction of public works."  
100.]

*Be it enacted by the Senate and House of Representa-*  
*tives of the United States of America in Congress assem-*  
*bled,* That the Act entitled "An Act for the protection  
of persons furnishing materials and labor for the con-  
struction of public works," approved August thirteenth,  
eighteen hundred and ninety-four, is hereby amended so  
as to read as follows:

*Contractors* "That hereafter any person or persons entering into a  
*on public* formal contract with the United States for the construc-  
*works.* tion of any public building, or the prosecution and com-  
*Protection of* pletion of any public work, or for repairs upon any  
*persons fur-* public building or public work, shall be required, before  
*nishing mate-* commencing such work, to execute the usual penal bond.  
*rial, etc., to.* with good and sufficient sureties, with the additional obli-  
gation that such contractor or contractors shall promptly  
make payments to all persons supplying him or them with  
labor and materials in the prosecution of the work pro-  
vided for in such contract; and any person, company, or  
corporation who has furnished labor or materials used in  
the construction or repair of any public building or pub-  
lic work, and payment for which has not been made, shall  
have the right to intervene and be made a party to any  
action instituted by the United States on the bond of the  
contractor, and to have their rights and claims adjudi-  
cated in such action and judgment rendered thereon. sub-  
ject, however, to the priority of the claim and judgment

*Penal bond*  
*to include se-*  
*curity for la-*  
*bor, etc.*  
Vol. 28, p. 278,  
amended.

*Rights of per-*  
*sons, corpora-*  
*tions, etc.*

of the United States. If the full amount of the liability of the surety on said bond is insufficient to pay the full amount of said claims and demands, then, after paying the full amount due the United States, the remainder shall be distributed pro rata among said interveners. If no suit should be brought by the United States within six months from the completion and final settlement of said contract, then the person or persons supplying the contractor with labor and materials shall, upon application therefor, and furnishing affidavit to the Department under the direction of which said work has been prosecuted that labor or materials for the prosecution of such work has been supplied by him or them, and payment for which has not been made, be furnished with a certified copy of said contract and bond, upon which he or they shall have a right of action, and shall be, and are hereby, authorized to bring suit in the name of the United States in the circuit court of the United States in the district in which said contract was to be performed and executed, irrespective of the amount in controversy in such suit, and not elsewhere, for his or their use and benefit, against said contractor and his sureties, and to prosecute the same to final judgment and execution: *Provided*, That where suit is instituted by any of such creditors on the bond of the contractor it shall not be commenced until after the complete performance of said contract and final settlement thereof, and shall be commenced within one year after the performance and final settlement of said contract, and not later: *And provided further*, That where suit is so instituted by a creditor or by creditors, only one action shall be brought, and any creditor may file his claim in such action and be made party thereto within one year from the completion of the work under said contract, and not later. If the recovery on the bond should be inadequate to pay the amounts found due to all of said creditors, judgment shall be given to each creditor pro rata of the amount of the recovery. The surety on said bond may pay into court, for distribution among said claimants and creditors, the full amount of the sureties' liability, to wit, the penalty named in the bond, less any amount which said surety may have had to pay to the United States by reason of the execution of said bond, and upon so doing the surety will be relieved from further liability: *Provided further*, That in all suits instituted under the provisions of this Act such personal notice of the pendency of such suits, informing them of their right to intervene as the court may order, shall be given to all known creditors, and in addition thereto notice of publication in some newspaper of general circulation, published in the State or town where the contract is being performed, for at least three successive weeks, the last publication to be at least three months before the time limited therefor."

Action on  
bond for labor  
or material  
furnished.

Jurisdiction.

Proviso.  
Time limit.

Creditors  
limited to sin-  
gle action.

Judgment  
where bond is  
inadequate.

Payment by  
sureties on  
bond.

Personal no-  
tice to credit-  
ors.

Publication  
of notice.

Approved, February 24, 1905.



Feb. 25, 1905.  
Vol. 33, p. 814.

**CHAP. 797.**—An Act Relating to a dam across Rainy River.

[H. R. 17331.]  
[Public, No.  
103.]

Rainy River,  
Minn.

Rainy River  
Improvement  
Company to  
succeed to  
rights of for-  
mer company.

Vol. 30, p.  
398.

Vol. 31, p.  
167.

Vol. 32, p.  
485.

*Provided.*  
Time of con-  
struction.

Proof of suc-  
cession.

Amendment.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Rainy River Improvement Company, a corporation organized under the laws of the State of Minnesota for the improvement of the navigation of Rainy River and Rainy Lake, and its successors and assigns, upon filing with the Secretary of War proof satisfactory to him of its succession to the rights and privileges granted to the Koochiching Company by the following Acts of Congress, namely: Chapter two hundred and thirty-eight of volume thirty of the Statutes at Large, "An Act permitting the building of a dam across Rainy Lake River," approved May fourth, eighteen hundred and ninety-eight; chapter three hundred and forty-six of volume thirty-one of the Statutes at Large, "An Act to amend an Act entitled 'An Act permitting the building of a dam across Rainy Lake River,' " approved May fourth, nineteen hundred; chapter thirteen hundred and five, volume thirty-two, of the Statutes at Large, "An Act relating to the construction of a dam across Rainy River," approved June twenty-eighth, nineteen hundred and two, shall have the right, subject to the restrictions, conditions, and terms of said several Acts, to construct and maintain the dam provided for therein, at such height as the Secretary of War may approve: *Provided,* That such dam shall be completed on or before July first, nineteen hundred and eight.

**SEC. 2.** That upon filing the proof of its succession to the rights of the Koochiching Company, and the approval thereof by the Secretary of War, that officer shall issue to the Rainy River Improvement Company a certificate of such approval.

**SEC. 3.** That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 25, 1905.

Feb. 25, 1905.  
Vol. 33, p. 814.

[H. R. 17939.]  
[Public, No.  
104.]

Rio Grande,  
N. Mex.

Dam, etc.,  
authorized un-  
der reclama-  
tion act.

Vol. 32, p.  
388.

Location.

**CHAP. 798.**—An Act Relating to the construction of a dam and reservoir on the Rio Grande, in New Mexico, for the impounding of the flood waters of said river for purposes of irrigation.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the provisions of the reclamation Act approved June seventeenth, nineteen hundred and two, shall be extended for the purposes of this Act to the portion of the State of Texas bordering upon the Rio Grande which can be irrigated from a dam to be constructed near Engle, in the Territory of New Mexico, on the Rio Grande, to store the flood waters of that river, and if there shall be ascertained to be sufficient land in New Mexico and in Texas which can be supplied with the stored water at a

cost which shall render the project feasible and return to the reclamation fund the cost of the enterprise, then the Secretary of the Interior may proceed with the work of constructing a dam on the Rio Grande as part of the general system of irrigation, should all other conditions as regards feasibility be found satisfactory.

Approved, February 25, 1905.

**CHAP. 1158.**—An Act Making provision for conveying in fee certain public grounds in the city of Saint Augustine, Florida, for school purposes.

Feb. 27, 1905.  
Vol. 33, p. 815.

[S. 3479.]  
[Public, No. 107.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That any conveyance heretofore or hereafter made by the mayor of Saint Augustine, Florida, to the board of public instruction of Saint Johns County, Florida, of that certain tract or parcel of ground situate in the said city of Saint Augustine, Florida, known as the "old burnt hospital lot," heretofore conveyed by the United States Government to the mayor of Saint Augustine, Florida, in trust for school purposes, be, and the same is hereby, authorized, ratified, and confirmed; and the title in and to said lot, upon such conveyance being made, shall vest the title to said ground in fee in the board of public instruction of Saint Johns County, Florida, aforesaid. And the said board of public instruction of Saint Johns County, Florida, is hereby authorized to sell and convey said lot of ground, and to use and appropriate the proceeds thereof in the erection and construction of a public school building in said city of Saint Augustine, Florida.

Florida.  
Conveyance of "old burnt hospital lot" to St. Johns County, authorized, etc.

Title.

Sale.

Use of proceeds.

Approved, February 27, 1905.

**CHAP. 1161.**—An Act To authorize the construction of a bridge across Red River at or near Boyce, Louisiana.

Feb. 27, 1905.  
Vol. 33, p. 817.

[H. R. 18815.]  
[Public, No. 110.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Boyce Bridge Company, a corporation duly incorporated and existing under and by virtue of the laws of the State of Louisiana, and domiciled at Boyce, Rapides Parish, said State, be, and it is hereby, authorized to construct and maintain a traffic bridge and approaches thereto across the Red River, extending from such a point at or near the town of Boyce, in the Parish of Rapides, to such a point in Grant Parish as may be selected by said bridge company and approved by the Secretary of War. Said bridge shall be constructed to provide for the passage of vehicles, foot passengers, stock, and such other lawful traffic as may be desired, at such legal rates of toll

Red River.  
Boyce Bridge Company may bridge, at Boyce, La.

Wagon and foot bridge.



as may be fixed by said company and approved by the Secretary of War.

Lawful structure and post route.

Telegraph, etc., rights.

Proviso. Unobstructed navigation.

Opening draw.

Lights, etc.

Changes.

Litigation.

Proviso. Existing laws not affected.

Secretary of War to approve plans, etc.

SEC. 2. That said bridge built under this Act, and subject to its limitations, shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States than the rate paid for the transmission over the public highways leading to the said bridge, and shall enjoy the rights and privileges of other post-roads in the United States; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies; and the United States shall have the right of way across said bridge and its approaches for postal-telegraph purposes: *Provided*, That the bridge herein authorized to be constructed shall be so kept and managed by the said corporation owning or operating it as to afford proper ways and means for the passage through or under it of vessels, barges, or rafts at all times, both by day and by night; and if said bridge be constructed as a drawbridge, the draw shall be opened promptly upon reasonable signal for the passage of boats; and upon whatever kind of bridge is built there shall be displayed from sunset to sunrise, at the expense of said corporation, such lights and signals as the Light-House Board shall prescribe.

SEC. 3. That if said bridge, erected and maintained under the authority of this Act, shall at any time substantially or materially obstruct the free navigation of said river, or shall, in the opinion of the Secretary of War, obstruct such navigation, he is hereby authorized to cause such change or alteration of said bridge to be made as will effectually obviate such obstruction, and such alteration shall be made and all such obstructions be removed at the expense of the owners or operators of said bridge, and in case of any litigation arising from the obstruction or alleged obstruction to the free navigation of said river, the case may be brought in the district court of the United States for the western district of Louisiana: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers, or to exempt said bridge from the operation of same.

SEC. 4. That the bridge authorized to be constructed under this Act shall be built and located under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the said corporation shall submit to the Secretary of War, for his examination and approval, a design and drawing of said bridge and a map of the location, prepared with reference to known datum plane upon prescribed scales furnished by the engineer officer having supervision of said river, and giving, for the

space of two miles above and two miles below the proposed location of the bridge, the topography of the banks of the river, with shore lines at high and low water, the direction and strength of the currents at all stages, and the soundings, accurately showing the bed of the stream, the location of any other bridge or bridges, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject. And until said plans and location of the bridge are approved by the Secretary of War the bridge shall not be built; and should any change be made in the plan of the said bridge during the process of construction, or after completion, such change shall be subject to the approval of the Secretary of War.

SEC. 5. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date of the approval hereof. Time of construction.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 27, 1905.

**CHAP. 1162.**—An Act To extend the time for the construction of a bridge across Rainy River by the International Bridge and Terminal Company. Feb. 28, 1905.  
Vol. 33, p. 818.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the International Bridge and Terminal Company, its successors and assigns, shall have the right to commence the construction of a bridge across Rainy River, in Minnesota, subject to the terms and conditions contained in an Act entitled "An Act to provide for the construction of a bridge across Rainy River, in Minnesota," approved February seventh, nineteen hundred and three, within one year, and complete such bridge within three years after the passage of this Act. [H. R. 18751.]  
[Public, No. 111.]  
Rainy River, Minn.  
Time extended for bridging, by International Bridge and Terminal Company.  
Vol. 32, p. 802, amended.  
Time of construction.

Approved, February 28, 1905.

**CHAP. 1303.**—An Act To amend an Act to provide for eliminating certain grade crossings on the line of the Baltimore and Potomac Railway Company, in the city of Washington, District of Columbia, and requiring said company to depress and elevate its tracks, and to enable it to relocate parts of its railroad therein, and for other purposes, approved February twelfth, nineteen hundred and one. Mar. 2, 1905.  
Vol. 33, p. 823.  
[S. 7157.]  
[Public, No. 123.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section twelve of the "Act to provide for eliminating certain grade crossings on the line of the Baltimore and Potomac Railway Company, in the city of Washington, Alexandria and Mount Vernon Railway Company.

Time for  
completing un-  
derground elec-  
tric system  
extended.  
Vol. 31, p. 773,  
amended.

Time of con-  
struction.

Secretary of  
War may grant  
additional  
time.

Washington, District of Columbia, and requiring said company to depress and elevate its tracks, and to enable it to relocate parts of its railroad therein, and for other purposes," approved February twelfth, nineteen hundred and one, requiring the Washington, Alexandria and Mount Vernon Railway Company, in case it made use of the highway bridge across the Potomac River, in said Act provided for, to install a standard underground electric system of street-car propulsion on the park highway leading to said bridge, and that no dynamo furnishing power to such portion of its road should be in any manner connected with the ground, is hereby amended so as to permit said company to operate its cars, from the present terminus of its underground electric system at Fourteenth street and Maryland avenue southwest to the north end of said new highway bridge, by a standard overhead trolley system such as is now used by said company from said terminus of its underground electric system, as above, to the north end of the present Long Bridge; the privilege hereby extended to said company, however, to expire at the end of fourteen months from the time said new highway bridge shall be opened for traffic, or such additional time thereafter as the Secretary of War, who is hereby authorized to grant additional extensions of time, may deem that the new fill made for the approach to the new highway bridge has become sufficiently settled to permit of the proper and safe construction and installation of a standard underground electric system; at the expiration of all of which times, however, the requirements of said section twelve, above referred to, shall become operative, and the said company shall be compelled to comply therewith as therein provided.

Approved, March 2, 1905.

Mar. 2, 1905.  
Vol. 33, pp.  
827, 839.

[H. R. 17473.]  
[Public, No.  
127.]

Army appro-  
priations.

**CHAP. 1307.**—An Act Making appropriation for the support of the Army for the fiscal year ending June thirtieth, nineteen hundred and six.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and they are hereby appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Army for the year ending June thirtieth, nineteen hundred and six:

\* \* \* \* \*

Engineer De-  
partment.

#### ENGINEER DEPARTMENT.

Incidental  
expenses.

**ENGINEER DEPOTS:** For incidental expenses of the depots, including fuel, lights, chemicals, stationery, hardware, machinery, pay of civilian clerks, mechanics, and laborers, extra-duty pay to soldiers necessarily employed for periods not less than ten days as artificers on work in

addition to and not strictly in the line of their military duties, such as carpenters, blacksmiths, draftsmen, printers, lithographers, photographers, engine drivers, telegraph operators, teamsters, wheelwrights, masons, machinists, painters, overseers, laborers; repairs of, and for materials to repair, public buildings, machinery, and unforeseen expenses, eleven thousand five hundred dollars.

For purchase and repair of instruments to be issued to officers of the Corps of Engineers and to officers detailed and on duty as acting engineer officers for use on public works and surveys, five thousand dollars.

Purchase,  
etc., of instru-  
ments.

Engineer School, Washington, District of Columbia: Equipment and maintenance of the Engineer School of Application at Washington Barracks, District of Columbia, including purchase of instruments, machinery, im-

Engineer  
School, Wash-  
ington, D. C.  
Equipments,  
etc.

plements, models, and materials, for the use of the school and for instruction of engineer troops in their special duties as sappers and miners; for land mining, pontoniering, and signaling; for purchase and binding of professional works of recent date treating of military and civil engineering and kindred scientific subjects, for the library of the United States Engineer School; for incidental expenses of the school, including fuel, lights, chemicals, stationery, hardware, machinery, and boats; for pay of civilian clerks, draftsmen, electricians, mechanics, and laborers; for extra-duty pay to soldiers necessarily employed for periods not less than ten days as artificers on work in addition to and not strictly in the line of their military duties, such as carpenters, blacksmiths, draftsmen, printers, lithographers, photographers, engine drivers, telegraph operators, teamsters, wheelwrights, masons, machinists, painters, overseers, laborers; for repairs of, and materials to repair, public buildings, and machinery; for unforeseen expenses, for travel expenses of officers on journeys approved by the Chief of Engineers and made for the purpose of instruction: *Provided*, That the traveling expenses herein provided for shall be in lieu of mileage and other allowances; and to provide means for the theoretical and practical instruction at the Engineer School of Application, by the purchase of textbooks, books of reference, scientific and professional papers, and for other absolutely necessary expenses, twenty-five thousand dollars: *Provided further*, To cover extra expense in the establishment of the Engineer School and post at Washington Barracks, District of Columbia, due to difficult foundations, increased cost of labor, and other unforeseen and adverse contingencies, one hundred and fifty thousand dollars, to be immediately available.

Incidental  
expenses.

Travel ex-  
penses.

Provisos.  
In lieu of  
mileage.

Extra build-  
ing expense.  
Appropriation  
immediately  
available.

For intrenching tools, instruments, and drawing materials, and for purchase and printing of engineer manuals for use in the engineer equipment of troops, fifteen thousand dollars.

Instruments,  
etc.

For services of surveyors, draftsmen, photographers, master laborers, and clerks to engineer officers on the

Surveyors,  
etc.

staff of division, corps, and department commanders, twenty-five thousand dollars.

Total for Engineer Department, two hundred thirty-one thousand five hundred dollars.

\* \* \* \* \*

Approved, March 2, 1905.

Mar. 2, 1905. **CHAP. 1309.**—An Act Relating to the Monroe and Lake Providence Railroad Company.

[H. R. 17869.]  
[Public, No. 129.]

Boeuf River  
and Bayou  
Macon, La.  
Monroe and  
Lake Providence  
Railroad  
Company may  
bridge.  
Railroad  
bridge.

Secretary of  
War to ap-  
prove plans,  
etc.

Changes.

Lawful  
structure and  
post route.

Telegraph,  
etc., rights.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Monroe and Lake Providence Railroad Company, a corporation created and organized under the laws of the State of Louisiana, be, and the same is hereby, authorized to construct and maintain, for the passage of railway trains, bridges with single or double tracks and approaches thereto over Boeuf River and Bayou Maçon, in the State of Louisiana, at such locations as may be approved by the Secretary of War.

SEC. 2. That the said bridges shall be located and built under and subject to such regulations for the security of navigation as shall be prescribed by the Secretary of War, and the said company shall submit to the Secretary of War, for his examination and approval, designs and drawings of the bridges and maps of the locations, giving for the space of a mile above and a mile below the proposed locations the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the current at all stages, the soundings accurately showing the bed of the stream; and until the plans and locations have been approved by the Secretary of War the bridges shall not be built or commenced. The Secretary of War shall have power to require such other information as he may deem necessary for a full understanding of the subject. Any changes made in the plans of said bridges during the progress of construction or after completion shall be subject to the approval of the Secretary of War; and the said company shall, at its own expense, make such changes in said bridges as the Secretary of War may at any time direct in the interest of navigation.

SEC. 3. That any bridge built under this Act and subject to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which no higher charge shall be made for the transmission of mails and the troops and munitions of war of the United States over the same than the rate per mile paid for the transportation over the railroad or approaches leading to the said bridge; and it shall enjoy the rights and privileges of other post-roads in the United States, and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States



shall have the right of way across said bridges and their approaches for postal-telegraph and telephone purposes.

SEC. 4. That each of the said bridges shall be constructed with its center line substantially at right angles to the current of the river, and as a drawbridge, so that a free and unobstructed passageway may be secured to all water craft navigating said river. The draws shall be opened promptly, upon reasonable signals, for the passage of boats or vessels, and the said company shall maintain at its own expense, from sunset to sunrise, such lights or other signals as the Light-House Board shall prescribe.

SEC. 5. That all railroad companies desiring the use of the said bridges shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same, and over the approaches thereto, upon the payment of reasonable compensation for such use; and in case the owner or owners of said bridges, and the several railroad companies, or any one of them, desiring such use, shall fail to agree upon the sum or sums to be paid and upon rules and conditions to which each shall conform in using said bridges, all matters in issue between them shall be decided by the Secretary of War upon the hearing of the allegations and proofs of the parties.

SEC. 6. That the right to alter, amend, or repeal this Act is expressly reserved; and this Act shall be null and void if actual construction of the bridges herein authorized be not commenced within one year and completed within three years from the approval of this Act.

Approved, March 2, 1905.

**CHAP. 1812.**—An Act To authorize the city of Buffalo, New York, to construct a tunnel under Lake Erie and Niagara River and to erect and maintain an inlet pier therefrom for the purpose of supplying the city of Buffalo with pure water.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That it shall be lawful for the city of Buffalo, in the State of New York, to construct and maintain a tunnel under Lake Erie, Niagara River, Black Rock Harbor, and the United States lands known as Fort Porter, extending from a point two hundred yards, more or less, northeast of the Horseshoe Reef light in the Emerald channel ten thousand feet to the present pumping station of the city of Buffalo, and to erect and maintain an inlet pier therefrom, said inlet pier to be located in the Emerald channel not more than six hundred feet northeast of the present Horseshoe Reef light: *Provided*, That the top of the said tunnel shall be located at least forty feet below mean lake level, and that the city of Buffalo shall maintain a light from sunset to sunrise on the inlet pier at its own expense.

Approved, March 2, 1905.

Unobstructed navigation.

Lights, etc.

Use by other roads.

Compensation.

Amendment. Time of construction.

Mar. 2, 1905. Vol. 33, p. 843. [H. R. 18637.] [Public, No. 132.]

Buffalo, N. Y. Tunnel under Lake Erie, etc., authorized for water supply. Location.

Inlet pier.

Proviso. Top of tunnel.

Lights.

Mar. 2, 1905. **CHAP. 1313.**—An Act To authorize the board of supervisors  
Vol. 33, p. 843. of Berrien County, Michigan, to construct a bridge across the  
[H. R. 18728.] Saint Joseph River near its mouth in said county.  
[Public, No.  
133.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the board of supervisors of Berrien County, in the State of Michigan, be, and are hereby, authorized to construct, maintain, and operate a bridge across the Saint Joseph River near its mouth in said Berrien County, at or near the site of the bridge now known as Napier Bridge.

Secretary of War to approve plans, etc.

Changes.

Post route.

Telegraph, etc., rights.

Unobstructed navigation.

Lights, etc.

Time of construction.

Amendment.

SEC. 2. That said bridge shall be located and built under and subject to such regulations for the security of navigation as the Secretary of War may prescribe; and to secure that object the said board of supervisors shall submit for his examination designs and drawings of the bridge and maps of the location, and until the said plans and location are approved by him the bridge shall not be commenced or built; and should any changes be made in said bridge, before or after completion, such changes shall be likewise subject to the approval of the Secretary of War. That the bridge shall be known and recognized as a post route, and shall enjoy the rights and privileges of other post-roads of the United States, and no charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal, telegraph, and telephone purposes.

SEC. 3. That the said bridge shall be so kept and managed as to offer reasonable and proper means for the passage of vessels and other craft through or under the same; and for the safety of vessels passing at night there shall be displayed on said bridge from sunset to sunrise, at the expense of the owners thereof, such lights or other signals as the Light-House Board may prescribe. And any changes in said bridge which the Secretary of War may at any time deem necessary and order in the interests of navigation shall be made by the owners thereof at their own expense.

SEC. 4. That this Act shall be null and void if actual construction of the said bridge be not commenced in one year and completed in three years from the date hereof.

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 2, 1905.



**CHAP. 1814.**—An Act To amend an Act entitled "An Act to authorize the board of commissioners for the Connecticut bridge and highway district to construct a bridge across the Connecticut River at Hartford, in the State of Connecticut." Mar. 2, 1905. Vol. 33, p. 844. [H. R. 19013.] [Public, No. 134.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section one of an Act entitled "An act to authorize the board of commissioners for the Connecticut bridge and highway district to construct a bridge across the Connecticut River at Hartford, in the State of Connecticut," approved February eighteenth, nineteen hundred and three, be amended so as to read as follows: "The board of commissioners for the Connecticut River bridge and highway district, a body politic and corporate, created by the laws of the State of Connecticut, be, and hereby is, authorized to construct and maintain a drawless bridge across the Connecticut River at Hartford, in the State of Connecticut, between the city of Hartford and the town of East Hartford: *Provided*, That the owners of said bridge shall, at their own expense, place a draw in the bridge whenever so ordered by the Secretary of War, the said draw to be built at such location and to afford such clear openings as he may decide to be necessary in the interest of navigation."

Approved, March 2, 1905.

**CHAP. 1402.**—An Act Making appropriations for fortifications and other works of defense, for the armament thereof, for the procurement of heavy ordnance for trial and service, and for other purposes. Mar. 3, 1905. Vol. 33, pp. 845, 847. [H. R. 17094.] [Public, No. 135.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the sums of money herein provided for be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to be available until expended, namely:

#### FORTIFICATIONS AND OTHER WORKS OF DEFENSE.

For modernizing older emplacements, four hundred and fifty thousand dollars. Modernizing old emplacements.

For construction of fire control stations and accessories, including purchase of lands and rights of way, and for the purchase, installation, operation, and maintenance of necessary lines and means of electrical communication, including telephones, dial and other telegraphs, wiring and all special instruments, apparatus, and materials, coast signal apparatus, and salaries of electrical experts, engineers, and other necessary employees, connected with the use of coast artillery; for the purchase, manufacture, and test of range finders and other instruments for fire Range finders, etc.

full for the purposes following, being for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and six, namely:

Improvements  
and repairs.

## IMPROVEMENTS AND REPAIRS.

Highway  
bridge, Potomac River.  
Construction.

For completing construction, including approaches and acquisition of land therefor, of the highway bridge across the Potomac River at Washington, District of Columbia, and for personal services and any and all purposes connected therewith, two hundred thousand dollars.

Maintenance.

For maintenance of said bridge, including necessary personal services therefor, seven thousand dollars.

Anacostia  
Bridge.  
Mode of re-  
construction.  
Vol. 33, p. 372.

The reconstruction of the Anacostia Bridge authorized in the District of Columbia appropriation Act for the fiscal year nineteen hundred and five may be on the line of the existing bridge or on such other line as may be determined by the Commissioners of the District of Co-

Limit of cost  
increased.

lumbia; and the limit of cost for this work is increased from two hundred and fifty thousand dollars to three hundred and seventy-five thousand dollars, and the said Commissioners are hereby authorized to acquire, by purchase or condemnation, out of the appropriation made for said reconstruction, such land as is necessary to provide proper approaches for said bridge, and in case there

Approaches.

is any dispute regarding the title of any land so condemned, the value thereof, as determined under said condemnation proceedings, shall be deposited into the registry of the court, and upon such deposit being made the title to the land claimed shall be vested in the District of Columbia: *Provided*, That the time within which said bridge shall be constructed is extended to July first, nineteen hundred and seven: *And provided further*, That in addition to the requirements heretofore made as to the payment for a portion of said work upon said bridge by the Anacostia and Potomac River Railroad Company, said company shall, when directed by the said Commissioners, deposit with the collector of taxes of the district of Columbia, to the credit of the appropriation for the reconstruction of said bridge, the sum of three thousand three hundred dollars, to defray the cost of such under-

Provisions.  
Time of construction.  
Underfloor  
electrical conductors for  
street railroad.

floor construction as may be necessary in order that the cars of said company may be propelled over said bridge by underfloor electrical conductors or cables, and the entire cost of maintenance of said underfloor construction shall thereafter be borne by said railroad company, and no cars shall be propelled across said bridge unless all electrical conductors or cables furnishing power for the propulsion of the same shall be placed under floor of said bridge.

WASHINGTON AQUEDUCT.

Washington  
Aqueduct.

Maintenance.

For operation, including salaries of all necessary employees, maintenance, and repair of the aqueduct and its accessories, including Conduit road, the Washington City reservoir, and Washington Aqueduct tunnel, and also including the purchase and maintenance of horses, vehicles, and harness, and the care and maintenance of the stable heretofore and now in use, thirty-three thousand dollars.

Filtration  
plant.

For care, including salaries of all necessary employees, maintenance, and operation of the Washington, District of Columbia, Aqueduct filtration plant, and for each and every purpose connected therewith, a sum not exceeding seventy thousand dollars may be used out of the appropriations heretofore made for the construction of said filtration plant, and estimates hereunder shall be submitted in detail for the fiscal year nineteen hundred and seven.

Estimates.

\* \* \* \* \*

SEC. 9. That all laws and parts of laws to the extent that they are inconsistent with this Act are repealed.

Approved, March 3, 1905.

CHAP. 1414.—An Act For the establishment of public convenience stations in the District of Columbia.

Mar. 3, 1905.  
Vol. 33, p. 984.

[S. 4156.]  
[Public, No. 147.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Commissioners of the District of Columbia be, and they are hereby, authorized and empowered to construct and establish, in the city of Washington, District of Columbia, two public convenience stations, each of the same to afford accommodations for twenty males and ten females.

District of  
Columbia.  
Establish-  
ment of pub-  
lic convenience  
stations in.

SEC. 2. That the said public convenience stations shall be located on public space to be selected by the said Commissioners of the District of Columbia. And the jurisdiction and control of such portion of any public reservation so selected as shall be required for the location of such stations and their approaches is hereby transferred from the Chief of Engineers of the United States Army to the Commissioners of the District of Columbia, such transfer to take effect from the date of notice by the said Commissioners to the Chief of Engineers of the United States Army of the location of sites of such stations.

Location of  
sites.

Right of con-  
trol transferred  
to Commis-  
sioners.

\* \* \* \* \*

Approved, March 3, 1905.

Mar. 3, 1905. **CHAP. 1415.**—An Act Regulating the use of telegraph wires  
Vol. 33, p. 984. in the District of Columbia.

[S. 4938.]  
[Public, No.  
148.]

District of  
Columbia.

Removal of  
telegraph poles  
and wires.

Area of re-  
moval.

Duty of the  
Commissioners.

Underground  
conduits, etc.

Conduits, etc.,  
in parks and  
reservations.

Regulations.

Provisions.  
Fire-alarm,  
etc., wires.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That all telegraph poles and the wires attached thereto, not the property of the United States or the District of Columbia, now upon the streets, avenues, and alleys within the fire limits of the District of Columbia, except as hereinafter provided, shall from time to time, as may be prescribed by the Commissioners of said District, be taken down and removed. The work of taking down and removing said poles and wires shall be done under the direction of said Commissioners, and it is hereby made the duty of said Commissioners to enforce compliance with the provisions of this Act as expeditiously as may be consistent with the public interests; and the said Commissioners are hereby empowered, from time to time, to authorize any company or corporation now or hereafter operating and maintaining a telegraph plant or system in the District of Columbia to locate and construct a system of underground conduits, subsidiaries, and manholes in or under any or all of the streets, avenues, alleys, lanes, or other public highways in said District, as may be requisite and necessary for the purpose of this Act and for the reception of such other conduits, cables, and wires as may be reasonably required in the future by the growth of such company or corporation or its assigns, or to adequately meet the requirements of the public for telegraph service.

\* \* \* \* \*

**SEC. 4a.** That any officer of the United States Government charged with the care, maintenance, and supervision of any public park or reservation may grant permission to any company or corporation now or hereafter maintaining and operating a telegraph plant or system in said District, upon application being made therefor, to construct conduits, subsidiaries, or manholes in said park or reservation, under such reasonable regulations as said officer may prescribe, unless, in the judgment of said officer, said construction will result in injury to the United States or its properties.

**SEC. 5.** That all subways, conduits, manholes, and overhead lines constructed or erected under the provisions of this Act shall be subject to such reasonable regulations as the Commisisoners of the District of Columbia may from time to time prescribe as to inspection, location, character of conduit construction, and height of poles and wires: *Provided,* That in all underground conduits so constructed such space shall be furnished to the said District of Columbia and the United States as may be necessary for their telegraph, fire-alarm, and police-patrol wires or cables carrying low potential currents of

electricity, free of charge: *And provided further*, That the number of ducts so reserved in any one conduit shall not be more than two. Maximum ducts reserved.

\* \* \* \* \*

SEC. 7. That Congress reserves the right to alter, amend, or repeal this Act, but nothing herein shall abridge or lessen the rights granted telegraph companies under title sixty-five, section fifty-two hundred and sixty-three and the following, United States Revised Statutes. Amendment.  
Prior rights not affected.  
R. S., sec. 5263, p. 1019.

SEC. 8. That if at any time the District of Columbia or the National Government shall acquire, by purchase, condemnation proceedings, or otherwise, the property of any telegraph company in the District of Columbia, nothing shall then be paid for the rights accorded under this bill to build and lay such conduits. Government ownership.

Approved, March 3, 1905.

**CHAP. 1421.**—An Act To cause certain lands heretofore withdrawn from market for reservoir purposes to be restored to the public domain, subject to entry under the homestead law, with certain restrictions. Mar. 3, 1905.  
Vol. 33, p. 990.  
[S. 6644.]  
[Public, No. 154.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That there is hereby restored to the public domain, subject to the easement provided for in section two hereof, all the lands described in a certain proclamation of the President of the United States, dated November twenty-eighth, eighteen hundred and eighty-one, Executive Document Numbered Eight hundred and seventy-two, withdrawing and withholding certain lands from market or entry and reserving the same to aid in the construction of certain reservoirs to be built at the headwaters of the Mississippi and Saint Croix rivers, in the States of Minnesota and Wisconsin, and of the Chippewa and Wisconsin rivers, in the State of Wisconsin, except lot seven of section thirty-three, and lot five of section thirty-four, township one hundred and forty-four, range twenty-eight west of the fifth principal meridian; and that these lands when so restored shall be subject to homestead entry only. Public lands.  
Lands reserved for reservoirs at headwaters of Mississippi River, etc., restored to public domain.

SEC. 2. That the lands hereby restored shall forever be and remain subject to the right of the United States to overflow the same, or any thereof, by such reservoirs as now exist or may hereafter be constructed upon the headwaters of the Mississippi River, and all patents issued for the lands hereby restored shall expressly reserve to the United States such right of overflow. Homestead entry.  
Right to overflow reserved.

SEC. 3. That in all cases where any of the lands restored to the public domain by the first section of this Act have heretofore been sold or disposed of by the proper officers of the United States under color of the public-land laws, and the consideration received therefor is still retained Preference rights.

by the Government, the title of the purchasers may be confirmed, subject to the easement reserved by section two, if, in the opinion of the Secretary of the Interior, justice requires it; and in all cases where first or preliminary homestead entries have been made of the lands hereby restored, and the entrymen have attempted to make final proof and final entry, such entrymen shall have a preferred and prior right to enter such lands under the homestead law on showing a compliance with the requirements of said law as to settlement, cultivation, proof, and payment.

Warning to  
settlers.

SEC. 4. That no rights of any kind, except as specified in the foregoing section, shall attach by reason of settlement or squatting upon any of the lands hereinbefore described before the day on which such lands shall be subject to homestead entry at the several land offices; and until said lands are opened for settlement no person shall enter upon and occupy the same, and any person violating this provision shall never be permitted to enter any of said lands or acquire any title thereto.

Effect.

SEC. 5. That this Act shall take effect six months after its approval by the President of the United States.

Approved, March 3, 1905.

Mar. 3, 1905. Vol. 33, p. 997. [S. 7164.] [Public, No. 161.] **CHAP. 1428.**—An Act Permitting the building of a railway bridge across White River, joining the township of Harrison, in Knox County, State of Indiana, and township of Washington, in Pike County, State of Indiana.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled,* That the consent of Congress is hereby granted to the Vincennes, West Baden and Louisville Traction Company, a railway corporation organized under the laws of the State of Indiana, its successors or assigns, to build a railway bridge across the White River, at a point suitable to the interests of navigation, joining the township of Harrison, in Knox County, State of Indiana, and the township of Washington, in Pike County, State of Indiana: *Provided,* That the plans for the said bridge and appurtenant works and the location thereof shall be submitted to and approved by the Chief of Engineers and the Secretary of War before the commencement of construction: *And provided further,* That said Vincennes, West Baden and Louisville Traction Company, its successors or assigns, shall not deviate from such plans after such approval either before or after the completion of the said bridge unless the modification of said plans shall have been previously submitted to and received the approval of the Chief of Engineers and of the Secretary of War, and any changes in said bridge which the Secretary of War may at any time order in the interest of naviga-

White River,  
Ind. Vincennes,  
West Baden  
and Louisville  
Traction Com-  
pany may  
bridge.  
Location.

Provisos.  
Secretary of  
War to ap-  
prove plans.

Changes.



tion shall be promptly made by said company at its own expense.

SEC. 2. That in case any litigation arises from the building of said bridge or from the obstruction of said river by said bridge cases may be tried in the proper courts, as now provided for that purpose in the State of Indiana, and in the courts of the United States: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers or to exempt said bridge from the operation of same.

Litigation.

*Provided.*  
Existing laws not affected.

SEC. 3. That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same and over the approaches thereto upon payment of a reasonable compensation for such use; and in case of disagreement between the parties in regard to the compensation to be paid or the conditions to be observed all matters at issue shall be determined by the Secretary of War.

Use by other companies.

Compensation.

SEC. 4. That any bridge built under this Act and subject to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which no higher charge shall be made for the transmission of mails and the troops and munitions of war of the United States over the same than the rate per mile paid for the transportation over the railroad or approaches leading to the said bridge; and it shall enjoy the rights and privileges of other post-roads in the United States, and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal telegraph and telephone purposes.

Lawful structure and post route.

Telegraph, etc., right.

SEC. 5. That this Act shall be null and void unless the bridge herein authorized be commenced within two years and completed within three years from the date of approval of this Act.

Time of construction.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 3, 1905.

CHAP. 1438.—An Act Authorizing the construction of a dam across Rock River at Lyndon, Illinois.

Mar. 3, 1905.  
Vol. 33, p. 1004.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That permission be given to Edward A. Smith, Harvey S. Green, and John J. Hurlbert, of Morrison, Illinois, or their assigns, to erect a dam with an eight-foot head across Rock River at or near Lyndon, Whiteside County,

[H. R. 15440.]  
[Public, No. 171.]

Rock River, Ill.  
Dam authorized across, at Lyndon.



*Provisos.*  
Secretary of  
War to ap-  
prove plans,  
etc.

Locks, etc.

Payment for  
damages.

Litigation.

Fishways.

Time of con-  
struction.

Amendment.

Illinois, the south end of said dam to be located near the line between sections twenty-one and twenty-two in town twenty north of range five east of the fourth principal meridian, and the north end of said dam to intersect the bank of said river in section twenty-one in the same town, range, and meridian: *Provided*, That the plans for the construction of said dam shall be submitted to and approved by the Chief of Engineers and the Secretary of War, and until approved by them the construction of the dam shall not be commenced; and after such approval the plans shall not be changed, either before or after the completion of the structure, unless authorized by the Chief of Engineers and the Secretary of War, and the Secretary of War may at any time require and enforce at the expense of the owners of the structure such modifications and changes in said structure as he may deem advisable in the interest of navigation: *Provided further*, That the Secretary of War may at any time require the grantees under this Act to construct at their own expense in connection with said dam suitable locks, canals, sluiceways, or other structures, for the passage of boats and other water craft, the said structures to be built upon plans which he may approve; and the said grantees shall maintain and operate said locks, canals, and other structures at their own expense, and shall pass all water craft through the same without delay and without any charge whatever as long as said dam is maintained; and if said dam and other structures shall be abandoned by the said grantees at any time, all portions thereof shall be promptly removed by the grantees at their own expense.

SEC. 2. That before entering upon the construction of the works herein authorized compensation shall be made to any person, firm, or corporation whose lands or other property may be taken, overflowed, or otherwise damaged by the construction, maintenance, and operations of the said works in accordance with the laws of the State where such lands or other property may be situated, and if any litigation arises from the construction, operation, or maintenance of the said works, cases may be tried in the proper courts, as now provided for that purpose in the State of Illinois and the courts of the United States.

SEC. 3. That such suitable fishways shall be constructed and maintained by the grantees under this Act at their own expense as may be required from time to time by the United States Fish Commission.

SEC. 4. That this Act shall be null and void if actual construction of the dam herein authorized be not commenced within two years and completed within four years from the date hereof.

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 3, 1905.

**CHAP. 1440.**—An Act Providing for the acquirement of water rights in the Spokane River along the southern boundary of the Spokane Indian Reservation, in the State of Washington, for the acquirement of lands on said reservation for sites for power purposes and the beneficial use of said water, and for other purposes. Mar. 3, 1905.  
Vol. 33, p.  
1006.  
[H. R. 15609.]  
[Public, No.  
173.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the right to the use of the waters of the Spokane River where the said river forms the southern boundary of the Spokane Indian Reservation may, with the consent of the Secretary of the Interior, be acquired by any citizen, association, or corporation of the United States by appropriation under and pursuant to the laws of the State of Washington.

Spokane Riv-  
er, Wash.  
Use of wa-  
ters.

**SEC. 2.** That the Secretary of the Interior be, and he hereby is, authorized and empowered to grant such appropriator or appropriators land on said reservation, whether the same has been allotted in severalty to any individual Indians, but which has not been conveyed to the allottee with full power of alienation, or whether the same remains unallotted, on the north bank of the said Spokane River, such as shall be necessary and requisite for overflow rights and for the erection of suitable water, electrical, or power plants, dams, wing walls, flumes, or other needful structures required for the development of power or for the beneficial use of said water: \* \* \*

Spokane In-  
dian Reserva-  
tion.  
Grant of  
lands of, for  
dams, etc.

**SEC. 5.** That the Secretary of the Interior shall make all needful rules and regulations not inconsistent herewith for the proper execution and carrying into effect of this Act.

Rules, etc.

Approved, March 3, 1905.

**CHAP. 1446.**—An Act Granting certain lands to the city of Tacoma, in the State of Washington, for use as a public park.

Mar. 3, 1905.  
Vol. 33, p.  
1013.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the title and fee to lots one, two, and three of section ten, and lots one, two, and three, and the south half of the southwest quarter of section fourteen, and lots one, two, three, four, five, and six, and the east half of the southeast quarter, and the northeast quarter of the northwest quarter, and the southwest quarter of the northeast quarter of section fifteen, of township twenty-one north, range two east, Willamette meridian, in the State of Washington, be, and the same are hereby, granted to the city of Tacoma, in the county of Pierce in said State, for its use as a public park; subject, however, to the right of the United States to at any and all time and in any manner assume control of, hold, use, and occupy, without license, consent, or leave from said city any or all of said lots for any and all military, naval, or light-house purposes, freed from any conveyances, charges, encumbrances,

[H. R. 17019.]  
[Public, No.  
179.]  
Public lands.  
Tacoma,  
Wash., granted  
lots for public  
park.

Reversion.

*Proviso.*  
Nonliability  
for damages.

To revert if  
not used.

or liens made, created, permitted, or sanctioned thereon by said city: *And provided*, That the United States shall not be or become liable for any damages or compensation whatever to the city of Tacoma for any future use by the Government of any or all of the above-described land for any of the above-mentioned purposes: *And provided further*, That if said lands shall not be used as a public park the same or such parts thereof not so used shall revert to the United States.

Approved, March 3, 1905.

Mar. 3, 1905.  
Vol. 33, p.  
1014.

[H. R. 17109.]  
[Public, No.  
181.]

District of  
Columbia.  
Square 1131,  
boundaries de-  
fined.

**CHAP. 1448.**—An Act To define the limits of square eleven hundred and thirty-one in the city of Washington, District of Columbia.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the surveyor of the District of Columbia is hereby authorized and directed to mark out an area as hereinafter more fully described, and the said surveyor of the District of Columbia is further directed to record a plat of said area surveyed and to designate it as square numbered eleven hundred and thirty-one of the city of Washington, namely: Bounded on the north side by the south line of H street south, two hundred and six feet; on the east by the west line of Twenty-first street east, prolonged south from the south line of H street south, as said Twenty-first street is now located, two hundred and eighty-five and thirty-three one-hundredths feet; on the south by the north line of I street south, produced from its present location, lying between Virginia avenue and Thirteenth street east, two hundred and six feet; on the west by the east line of Twentieth street east, prolonged south from the south line of H street south, as said Twentieth street east is now located, two hundred and eighty-five and thirty-three one-hundredths feet, containing fifty-eight thousand seven hundred and seventy-seven and ninety-eight one-hundredths square feet.

Approved, March 3, 1905.

Mar. 3, 1905.  
Vol. 33, p.  
1015.

[H. R. 17935.]  
[Public, No.  
184.]

Big Sandy  
River.  
Louisa and  
Fort Gay  
Bridge Com-  
pany may  
bridge, or  
branches, near  
Louisa, Ky.

**CHAP. 1451.**—An Act Authorizing the Louisa and Fort Gay Bridge Company, of Louisa, Kentucky, to erect a bridge across the Tug and Levisa forks of the Big Sandy River.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Louisa and Fort Gay Bridge Company, a corporation organized under the laws of the State of Kentucky, its successors or assigns, are hereby authorized and empowered to erect, establish, maintain, and operate a bridge across the Big Sandy River, or both branches thereof, at a point suitable to the interests of navigation,

at or near the city of Louisa, Kentucky, which said bridge may be used for general traffic purposes.

SEC. 2. That said bridge shall be built and located under and subject to such regulations for the security of navigation as the Secretary of War may prescribe, and to secure that object the said Louisa and Fort Gay Bridge Company shall submit for his examination designs and drawings of the bridge and maps of the location, giving for the space of one-half mile above and one-half mile below the proposed location the topography of the banks of the river, shore lines at low and high water, the direction and strength of the currents, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until the said plans and location are approved by him the bridge shall not be commenced or built.

Secretary of War to approve plans.

SEC. 3. That said bridge shall be kept and managed so as to offer reasonable and proper means for the passage of vessels through or under the same, and any changes in said bridge which the Secretary of War may at any time deem necessary to be made and shall prescribe shall accordingly be made by the said Louisa and Fort Gay Bridge Company, its successor or assigns, to conform to the instruction of the Secretary of War.

Unobstructed navigation.

SEC. 4. That the bridge constructed, maintained, and operated under this Act, and according to its limitations, shall be a lawful structure, and shall be recognized and known as a post route, and no higher charge shall be made for the transportation over the same and over the approaches thereto of the mails, troops, and munitions of war of the United States than is charged for like services for the general public; and the United States shall have the right of way for postal-telegraph and telephone purposes over said bridge and approaches; and equal privileges in the use of said bridge and approaches shall be granted to all telegraph and telephone companies; and if said bridge shall be constructed as a railroad bridge all railroad companies desiring the use thereof shall have and be entitled to equal rights and privileges relative to the passage of trains and cars over the same and over the approaches thereto, upon payment of a reasonable compensation for such use, and in case of disagreement between the parties in regard to the compensation to be paid or the conditions to be observed, all matters at issue shall be determined by the Secretary of War.

Lawful structure and post route.

Telegraph, etc., rights.

Use by railroad companies.

SEC. 5. That this Act shall be null and void if actual construction of said bridge be not commenced in one year and completed in three years from the date hereof.

Time of construction.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 3, 1905.

Mar. 3, 1905. **CHAP. 1458.**—An Act To extend the time for the commencement and completion of a bridge across the Missouri River at or near Pierre, South Dakota.

[H. R. 18513.]  
[Public, No. 191.]

Missouri River.

Time extended for bridging, by Duluth, Pierre and Black Hills Railroad Company, at Pierre, S. Dak.

Vol. 32, p. 659, amended.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section six of the Act approved July first, nineteen hundred and two, authorizing the Duluth, Pierre and Black Hills Railroad Company to construct a combined railroad, wagon, and foot-passenger bridge across the Missouri River at or near the city of Pierre, South Dakota, be, and is hereby, amended by extending the time for commencing the construction of said bridge to July first, nineteen hundred and six, and by extending the time for completing said bridge to January eighth, nineteen hundred and eight.

Approved, March 3, 1905.

Mar. 3, 1905. **CHAP. 1462.**—An Act To authorize the county of Quitman to construct a bridge across Coldwater River, Mississippi.

[H. R. 18596.]  
[Public, No. 195.]

Coldwater River, Miss.  
Quitman County may bridge, at Parnells Ferry.

*Proviso.*  
Secretary of War to approve plans, etc.

Wagon and foot bridge.

Lawful structure and post route.

Telegraph, etc., rights.

Changes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the county of Quitman, one of the counties of the State of Mississippi, duly created and organized under and by virtue of the laws of the said State, is hereby authorized and empowered to erect, construct, and maintain a bridge, by and through its proper officers, over the Coldwater River, near Parnells Ferry, in section twenty-five, township twenty-nine north, range two west, in the county of Quitman, State of Mississippi: *Provided,* That the plans and location of the said bridge are approved by the Secretary of War before the construction of the bridge is commenced. Said bridge shall be constructed to provide for the passage of wagons and vehicles of all kinds, for the transit of animals, and for foot passengers, under such rules and regulations as may be laid down by the proper officers of said county under the laws of the said State of Mississippi.

**SEC. 2.** That the bridge shall be a lawful structure, and shall be known and recognized as a post route, and shall enjoy the rights and privileges of other post-roads of the United States, and no charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal, telegraph, and telephone purposes; and any changes in the said bridge which the Secretary of War may require in the interest of navigation shall be made by the person or corporation owning or operating the same, at their own expense.



SEC. 3. That this Act shall be null and void if actual construction of said bridge herein authorized shall not be commenced in two years and completed within three years from the date of approval hereof.

Time of construction.

SEC. 4. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 3, 1905.

CHAP. 1463.—An Act To authorize the county of Quitman to construct a bridge across the Tallahatchie River, Mississippi.

Mar. 3, 1905.  
Vol. 33, p. 1034.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the county of Quitman, one of the counties of the State of Mississippi, duly created and organized under and by virtue of the laws of the said State, is hereby authorized and empowered to erect, construct, and maintain a bridge, by and through its proper officers, over the Tallahatchie River, in section seven, township twenty-six north, range one east, in said county, State of Mississippi: *Provided*, That the plans and location of the said bridge are approved by the Secretary of War before the construction of the bridge is commenced. Said bridge shall be constructed to provide for the passage of wagons and vehicles of all kinds, for the transit of animals, and for foot passengers, under such rules and regulations as may be laid down by the proper officers of said county under the laws of the said State of Mississippi.

[H. R. 18597.]  
[Public, No. 196.]

Tallahatchie River, Miss.  
Quitman County may bridge.

Location.

Proviso.  
Secretary of War to approve plans, etc.

Wagon and foot bridge.

SEC. 2. That the bridge shall be a lawful structure, and shall be known and recognized as a post route and shall enjoy the rights and privileges of other post-roads of the United States, and no charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal telegraph and telephone purposes; and any changes in the said bridge which the Secretary of War may require in the interest of navigation shall be made by the person or corporation owning or operating the same at their own expense.

Lawful structure and post route.

Telegraph, etc., rights.

Changes.

SEC. 3. That this Act shall be null and void if actual construction of said bridge herein authorized shall not be commenced in two years and completed within three years from the date of approval hereof.

Time of construction.

SEC. 4. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 3, 1905.

Mar. 3, 1905. **CHAP. 1464.**—An Act To authorize the county of Quitman to  
Vol. 33, p. 1035. construct a bridge across Coldwater River, Mississippi.

[H. R. 18598.]  
[Public, No. 197.]

Coldwater  
River, Miss.  
Quitman  
County may  
bridge, at  
Marks.

Proviso.  
Secretary of  
War to ap-  
prove plans,  
etc.

Wagon and  
foot bridge.

L a w f u l  
structure and  
post route.

Telegraph,  
etc., rights.

Changes.

Time of con-  
struction.

Amendment.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the county of Quitman, one of the counties of the State of Mississippi, duly created and organized under and by virtue of the laws of the said State, is hereby authorized and empowered to erect, construct, and maintain a bridge, by and through its proper officers, over the Coldwater River at or near Marks, in said county, State of Mississippi: *Provided,* That the plans and location of the said bridge are approved by the Secretary of War before the construction of the bridge is commenced. Said bridge shall be constructed to provide for the passage of wagons and vehicles of all kinds, for the transit of animals, and for foot passengers, under such rules and regulations as may be laid down by the proper officers of said county under the laws of the said State of Mississippi.

**SEC. 2.** That the bridge shall be a lawful structure, and shall be known and recognized as a post route, and shall enjoy the rights and privileges of other post-roads of the United States, and no charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal, telegraph, and telephone purposes; and any changes in the said bridge which the Secretary of War may require in the interest of navigation shall be made by the person or corporation owning or operating the same at their own expense.

**SEC. 3.** That this Act shall be null and void if actual construction of said bridge herein authorized shall not be commenced in two years and completed within three years from the date of approval hereof.

**SEC. 4.** That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 3, 1905.

Mar. 3, 1905.  
Vol. 33, p. 1040.

[H. R. 18902.]  
[Public, No. 203.]

Tug Fork,  
Big Sandy  
River.  
Everett  
Leftwich may  
bridge, at No-  
lan, W. Va.  
Railroad, etc.,  
bridge.

**CHAP. 1470.**—An Act To authorize Everett Leftwich, of Williamson, West Virginia, to bridge the Tug Fork of the Big Sandy River at Nolan, Mingo County, West Virginia, where the same forms the boundary line between the States of West Virginia and Kentucky.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That it shall be lawful for Everett Leftwich to construct and maintain a railroad, wagon, and foot bridge and approaches thereto across the Tug Fork of the Big Sandy River at Nolan, Mingo County, West Virginia,



where the same forms the boundary line between the States of West Virginia and Kentucky, as the said Everett Leftwich may deem suitable for his purposes, subject to the approval of the Secretary of War.

SEC. 2. That any bridge authorized to be constructed under this Act shall be a lawful structure, and shall be recognized and known as a post route, and shall enjoy all the rights and privileges of other post roads in the United States, upon which also no higher charge shall be made for the transmission over the same of the mails, or for through passengers, or freight passing over said bridge and approaches than the rate per mile paid for transportation over the railroads leading to said bridge; and the United States shall have the right of way for postal, telegraph, and telephone purposes without charge therefor across said bridge and approaches.

Said bridge shall be built and located under and subject to such regulations for the security of navigation as the Secretary of War shall prescribe; and to secure that object the said Everett Leftwich shall submit to the Secretary of War, for his examination and approval, a design and drawings of the bridge and a map of the location, giving for the space of one mile above and one mile below the purposed location the high and low water lines upon the banks of the river, the direction and strength of the current at all stages of the water, with the soundings, accurately showing the bed of the stream and the location of any other bridge or bridges, such map to be sufficiently in detail to enable the Secretary of War to judge of the proper location of said bridge, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until the said plans and locations are approved by the Secretary of War the bridge shall not be commenced or built; and should any change be made in the plan of said bridge during the progress of construction or after completion, such changes shall be subject to the approval of the Secretary of War, and any changes which the Secretary of War may require at any time in the said structure shall be promptly made by the said Everett Leftwich at his own expense.

SEC. 3. That on any bridge constructed under the provisions of this Act there shall be maintained at the expense of Everett Leftwich owning or controlling the same such lights and other signals as may be prescribed by the Light-House Board.

SEC. 4. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date hereof.

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 3, 1905.

L a w f u l  
structure and  
post route.

Telegraph,  
etc., rights.

Secretary of  
War to approve  
plans, etc.

Changes.

Lights, etc.

Time of con-  
struction.

Amendment.

Mar. 3, 1905. **CHAP. 1471.**—An Act Authorizing the construction of two  
Vol. 33, p. bridges across the Ashley River, in the counties of Charleston and  
1041. Dorchester, South Carolina.

[H. R. 18906.] *Be it enacted by the Senate and House of Representa-*  
[Public, No. 204.] *tives of the United States of America in Congress as-*  
*sembled,* That the assent of the United States of America  
Ashley River, S. C. is hereby given to the Charleston and Summerville Rail-  
and Summerville Railway Company, a corporation incorporated by the laws of  
Company may the State of South Carolina, its successors and assigns, and  
bridge, near such other persons as may be associated with it, to con-  
Charleston and Bacon's bridge. struct and maintain two bridges over the Ashley River,  
in the counties of Charleston and Dorchester, in the State  
aforesaid, one of said bridges to extend from a site on the  
east bank of the Ashley River at or near the northern  
limits of the city of Charleston across to the opposite  
shore, the other of said bridges to extend from the west to  
the east bank of the Ashley River at a point relatively  
near and reasonably distant from what is now known as  
Bacon's bridge.

Unobstructed navigation. SEC. 2. That the bridges shall be so constructed, by  
draw span or otherwise, that a free and unobstructed  
passage may be secured to all vessels and other water craft  
navigating said river at said point; that any bridges  
constructed under this Act shall be built and located  
under and subject to such regulations for the security of  
the navigation of said river as the Chief of Engineers  
and the Secretary of War shall prescribe, and to secure  
that object the said company shall submit to the Chief of  
Engineers and the Secretary of War, for their examina-  
tion and approval, the design and drawings of the  
bridges, piers, and approaches, and a map of the loca-  
tion, giving for the space of at least one mile above and  
one mile below the proposed location the topography of  
the banks of the river, the shore lines at high water and  
low water, and the direction and strength of the currents  
at all stages, and the soundings, accurately showing the  
bed of the stream, and the location of other bridge or  
bridges, wharves, landings, or ferries, and shall furnish  
such other information as shall be required for a full and  
satisfactory understanding of the subject; and until said  
plan and location of the bridges are approved by the  
Chief of Engineers and the Secretary of War the bridges  
shall not be commenced or built, and after such approval  
by the Chief of Engineers and the Secretary of War the  
approved plans and designs for the bridges shall not be  
deviated from or added to, either during the construc-  
tion or after the completion of the bridges, until the pro-  
posed change shall have been submitted to the Chief of  
Engineers and the Secretary of War and received their  
approval; and the said bridges shall be at all times so kept  
and managed as to offer reasonable and proper means for  
the passage of vessels navigating said river at said point

Secretary of  
War to approve  
plans, etc.

Changes.

through or under said bridges; and if said bridges be built with draws, said draws shall be opened promptly upon reasonable signal for the passage of boats or other craft; and whatever kind of bridges are built, the said company or corporation shall maintain, at its own expense, from sunset to sunrise, such lights or other signals thereon as the Light-House Board shall prescribe; and if at any time the navigation of said river shall in any manner be obstructed or impaired by the bridges authorized by this Act to be constructed the Secretary of War shall have authority, and it shall be his duty, to require said company to alter and change said bridges at its own expense in such manner as may be proper to secure free and complete navigation without impediment.

Lights, etc.

SEC. 3. That any bridges built under this Act and subject to its limitations shall be lawful structures, and shall be recognized and known as post routes, upon which also no higher charge shall be made for the transmission over the same of the mails, the troops, and munitions of war of the United States, or passengers or freight over said bridges, than the rate per mile paid for the transportation over the railroads or public highways leading to said bridges, and they shall enjoy the rights and privileges of other post-roads of the United States; and equal privileges in the use of said bridges shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridges and their approaches for postal-telegraph purposes.

Lawful structures and post routes.

Telegraph, etc., rights.

SEC. 4. That all railroad companies desiring the use of said bridges and their approaches shall have and be entitled to equal rights and privileges relative to the passage of trains over the same upon payment of a reasonable compensation for such use; and in case the owner or owners of said bridges and the several railroad companies, or any of them, desiring such use shall fail to agree upon the sum or sums to be paid, or upon rules and conditions to which each shall conform in using said bridges and approaches, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties.

Use by other companies.

SEC. 5. That this Act shall be null and void if actual construction of the bridges herein authorized be not commenced within one year and completed within three years from the date hereof.

Time of construction.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 3, 1905.

Mar. 3, 1905. **CHAP. 1472.**—An Act To authorize the Borderland Coal Com-  
 Vol. 33, p. 1042. pany, of Nolan, West Virginia, to bridge the Tug Fork of the Big  
 [H. R. 18358.] Sandy River at a point about two miles east of Nolan, Mingo  
 [Public, No. 205.] County, West Virginia; where the same forms the boundary line  
 between the States of West Virginia and Kentucky.

*Be it enacted by the Senate and House of Representa-  
 tives of the United States of America in Congress assem-  
 bled,* That it shall be lawful for the Borderland Coal  
 Company, a corporation organized under the laws of  
 West Virginia, to construct and maintain a footbridge  
 and approaches thereto across the Tug Fork of the Big  
 Sandy River at a point about two miles east of Nolan,  
 Mingo County, West Virginia, where the same forms the  
 boundary line between the States of West Virginia and  
 Kentucky, as the said company may deem suitable for its  
 purposes, subject to the approval of the Secretary of War.

**SEC. 2.** That any bridge authorized to be constructed  
 under this Act shall be a lawful structure, and shall be  
 recognized and known as a post route, and shall enjoy  
 all the rights and privileges of other post-roads in the  
 United States, upon which also no higher charge shall be  
 made for the transmission over the same of the mails, or  
 for through passengers, or freight passing over said  
 bridge and approaches than the rate per mile paid for  
 transportation over the railroads leading to said bridge;  
 and the United States shall have the right of way for  
 postal, telegraph, and telephone purposes without charge  
 therefor across said bridge and approaches. Said bridge  
 shall be built and located under and subject to such regu-  
 lations for the security of navigation as the Secretary of  
 War shall prescribe; and to secure that object the said  
 company or corporation shall submit to the Secretary of  
 War, for his examination and approval, a design and  
 drawings of the bridge and a map of the location, giving  
 for the space of one mile above and one mile below the  
 proposed location the high and low water lines upon the  
 banks of the river, the direction and strength of the cur-  
 rent at all stages of the water, with the soundings, accu-  
 rately showing the bed of the stream and the location of  
 any other bridge or bridges, such map to be sufficiently  
 in detail to enable the Secretary of War to judge of the  
 proper location of said bridge, and shall furnish such  
 other information as may be required for a full and satis-  
 factory understanding of the subject; and until the said  
 plans and locations are approved by the Secretary of War  
 the bridge shall not be commenced or built; and should  
 any change be made in the plan of said bridge during the  
 progress of construction or after completion, such changes  
 shall be subject to the approval of the Secretary of War,  
 and any changes which the Secretary of War may require  
 at any time in the said structure shall be promptly made  
 by the said company at its own expense.

**SEC. 4.** That on any bridge constructed under the pro-  
 visions of this Act there shall be maintained at the ex-

Tug Fork, Big  
 Sandy River.  
 Borderland  
 Coal Company  
 may bridge,  
 near Nolan, W.  
 Va.  
 Footbridge.

Lawful struc-  
 ture and post  
 route.

Telegraph  
 etc., rights.

Secretary of  
 War to approve  
 plans, etc.

Changes.

Lights, etc.

pense of the company or corporation owning or controlling the same such lights and other signals as may be prescribed by the Light-House Board.

SEC. 5. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date hereof. Time of construction.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, March 3, 1905.

**CHAP. 1474.**—An Act Permitting the building of a dam across the Mississippi River near the village of Bemidji, Beltrami County, Minnesota. Mar. 3, 1905.  
Vol. 33, p.  
1043.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the consent of Congress is hereby granted to Kirby Thomas, E. J. Swedback, and M. A. Spooner, their heirs, administrators, and assignees, to build a dam across the Mississippi River near the village of Bemidji, between the outlet of Lake Bemidji and Wolf Lake, Beltrami County, in said river, and near the village of Bemidji, Beltrami County, Minnesota, for the development of water power, and such works and structures in connection therewith as may be necessary or convenient in the development of said power and in the utilization of the power thereby developed: *Provided*, That the plans for the construction of said dam and appurtenant works shall be submitted to and approved by the Chief of Engineers and the Secretary of War before the commencement of the construction of the same: *And provided further*, That the said Kirby Thomas, E. J. Swedback, and M. A. Spooner, their heirs, administrators, and assignees, shall not deviate from such plans after such approval, either before or after the completion of said structure, unless the modification of said plans shall have previously been admitted to and received the approval of the Chief of Engineers and of the Secretary of War: *And provided further*, That there shall be placed and maintained in connection with said dam a sluiceway so arranged as to permit logs, timber, and lumber to pass around, through, or over said dam without unreasonable delay or hindrance and without toll or charges: *And provided further*, That the dam shall be so constructed that the Government of the United States may at any time construct in connection therewith a suitable lock for navigation purposes, and may at any time, without compensation, control the said dam so far as shall be necessary for purposes of navigation, but shall not destroy the water power developed by said dam and structures to any greater extent than may be necessary to provide proper facilities for navigation, and that the Secretary of War may at any time require and enforce, at the expense of the owners,

[H. R. 19026.]  
[Public, No. 207.]

Mississippi River.  
Dam across, near Bemidji, Minn., authorized.

*Provides.*  
Secretary of War to approve plans, etc.

*Modifications.*

Sluiceway.

Lock.



such modifications and changes in the construction of such a dam as he may deem advisable in the interests of navigation: *And provided further*, That suitable fishways and lights, to be approved by the Secretary of Commerce and Labor, shall be constructed and maintained at said dam by Kirby Thomas, E. J. Swedback, and M. A. Spooner, their heirs, administrators, and assignees.

Fishways,  
etc.

Litigation.

Proviso.  
Existing  
laws not af-  
fected.

Time of con-  
struction.

Amendment.

SEC. 2. That in case any litigation arises from the building of said dam or from the obstruction of said river by said dam or appurtenant works, cases may be tried in the proper courts as now provided for that purpose in the State of Minnesota and in the courts of the United States: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers or to exempt said structures from the operation of same.

SEC. 3. That this Act shall be null and void unless the dam herein authorized be commenced within one year and be completed within three years from the time of the passage of this Act.

SEC. 4. That the right to amend or repeal this Act is hereby expressly reserved.

Approved, March 3, 1905.

Mar. 3, 1905.  
Vol. 33, p.  
1045.

[H. R. 19118.]  
[Public, No.  
209.]

Yellowstone  
River, Mont.  
Dams under  
reclamation  
act.  
Vol. 32, p.  
388.

**CHAP. 1476.**—An Act To authorize the Secretary of the Interior to construct dams across the Yellowstone River in Montana in connection with irrigation works.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That where, in carrying out projects under the provisions of the national reclamation Act, it shall be necessary to construct dams in or across the Yellowstone River in the State of Montana, the Secretary of the Interior is hereby authorized to construct and use and operate the same in the manner and for the purposes contemplated by said reclamation Act.

Approved, March 3, 1905.

Mar. 3, 1905.  
Vol. 33, p.  
1046.

[H. R. 19140.]  
[Public, No.  
210.]

Cumberland  
River, Ky.  
Trigg County  
may bridge,  
at Canton.  
Wagon and  
footbridge.

**CHAP. 1477.**—An Act To authorize Trigg County, Kentucky, to bridge the Cumberland River at or near Canton, Trigg County, Kentucky.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That it shall be lawful for Trigg County, Kentucky, to construct and maintain a foot and wagon bridge and approaches thereto across the Cumberland River at or near Canton, Kentucky, as the county may deem suitable for its purposes, subject to the approval of the Secretary of War.

SEC. 2. That any bridge authorized to be constructed under this Act shall be a lawful structure and shall be recognized and known as a post route, and shall enjoy all the rights and privileges of other post-roads in the United States, upon which also no higher charge shall be made for the transmission over the same of the mails or for through passengers or freight passing over said bridge and approaches than the rate per mile paid for transportation over the railroads leading to said bridge, and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way for postal, telegraph, and telephone purposes without charge therefor across said bridge and approaches. Said bridge shall be built and located under and subject to such regulations for the security of navigation as the Secretary of War shall prescribe; and to secure that object the said county of Trigg shall submit to the Secretary of War, for his examination and approval, a design and drawings of the bridge and a map of the location giving for the space of one mile above and one mile below the proposed location the high and low water lines upon the banks of the river, the direction and strength of the current at all stages of the water, with the soundings accurately showing the bed of the stream and the location of any other bridge or bridges, such map to be sufficiently in detail to enable the Secretary of War to judge of the proper location of said bridge, and shall furnish such other information as may be required for full and satisfactory understanding of the subject. And until the said plans and location are approved by the Secretary of War, the bridge shall not be commenced or built, and should any change be made in the plan of said bridge during the process of construction, or after completion, such changes shall be subject to the approval of the Secretary of War, and any changes which the Secretary of War may require at any time in the said structure shall be promptly made by the said county of Trigg, State of Kentucky, at its own expense. A schedule of all tolls to be charged for passage, either for wagons or foot passengers, shall be approved by the Secretary of War.

Lawful structure and post route.

Telegraph, etc., rights.

Secretary of War to approve plans, etc.

Changes.

Tolls.

SEC. 3. That on any bridge constructed under the provisions of this Act there shall be maintained, at the expense of the county owning or controlling the same, such lights and other signals as may be prescribed by the Light-House Board.

Lights, etc.

SEC. 4. That this Act shall be null and void if actual construction of the bridge herein authorized be not completed within three years from the date hereof and commenced in one year from passage of this Act.

Time of construction.

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 3, 1905.



Mar. 3, 1905.  
Vol. 33, p.  
1117.

[H. R. 18809.]  
[Public, No.  
215.]

Rivers and  
harbors appro-  
priations.

York, Me.

Kennebunk  
River, Me.

Damariscotta  
River, Me.

New Harbor,  
Me.

Cocheco Riv-  
er, N. H.

Burlington,  
Vt.

Proviso.  
Contracts.

Limit.

Lake Cham-  
plain, N. Y.  
and Vt.

Newbury-  
port, Mass.

Salem, Mass.

Sandy Bay,  
Cape Ann,  
Mass.

Proviso.  
Contracts.

**CHAP. 1482.**—An Act Making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums of money be, and are hereby, appropriated, to be paid out of any money in the Treasury not otherwise appropriated, to be immediately available, and to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers, for the construction, completion, repair, and preservation of the public works hereinafter named:

Improving York Harbor, Maine: Completing improvement in accordance with the report submitted in House Document Numbered Three hundred and one, Fifty-eighth Congress, second session, thirteen thousand four hundred dollars.

Improving Kennebunk River, Maine: For maintenance, three thousand five hundred dollars.

Improving Damariscotta River, Maine: For improving said river in accordance with the project submitted in House Document Numbered Fifty-three, Fifty-eighth Congress, second session, five thousand dollars.

Improving New Harbor, Maine: For improving said harbor in accordance with the project submitted in House Document Numbered One hundred and sixty-seven, Fifty-eighth Congress, second session, ten thousand five hundred dollars.

Improving Cocheco River, New Hampshire: Completing improvement, twenty-one thousand seven hundred and eleven dollars.

Improving Burlington Harbor, Vermont: For repairs to breakwater and for maintenance, twenty thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary for the completion of the repairs of said breakwater, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate fifty-one thousand eight hundred and fifty-five dollars, exclusive of the amounts herein and heretofore appropriated.

Improving Narrows of Lake Champlain, New York and Vermont: Continuing improvement and for maintenance, two thousand five hundred dollars.

Improving harbor at Newburyport, Massachusetts: Continuing improvement, thirty thousand dollars.

Improving Salem Harbor, Massachusetts, in accordance with the report submitted in House Document Numbered Three hundred and three, Fifty-eighth Congress, second session, by providing a channel from deep water to the outer end of the wharves, twelve thousand dollars.

Improving harbor of refuge at Sandy Bay, Cape Ann, Massachusetts: Continuing improvement, one hundred thousand dollars: *Provided*, That a contract or contracts

may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Improving Lynn Harbor, Massachusetts: Continuing improvement, forty thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate ninety-seven thousand nine hundred and thirty-seven dollars, exclusive of the amounts herein and heretofore appropriated.

Lynn, Mass.

Proviso.  
Contracts.

Improving harbor at Boston, Massachusetts: Continuing improvement and for maintenance, one hundred thousand dollars.

Boston, Mass.

Improving harbor at Provincetown, Massachusetts: Continuing improvement, five thousand dollars.

Provincetown, Mass.

Improving harbors at Hyannis and Nantucket, Massachusetts: Continuing improvement and for maintenance, eighty thousand dollars.

Hyannis and  
Nantucket,  
Mass.

Improving harbor at New Bedford, Massachusetts, in accordance with the report submitted in House Document Numbered One hundred and sixty-nine, Fifty-sixth Congress, first session: Completing improvement, eleven thousand dollars.

New Bedford,  
Mass.

Improving Woods Hole channel, Massachusetts: Continuing improvement, seventy thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Woods Hole,  
Mass.Proviso.  
Contracts.

Improving Little Harbor, Woods Hole, Massachusetts, in accordance with the report submitted in House Document Numbered One hundred and sixty-two, Fifty-eighth Congress, second session: Completing improvement, eighteen thousand dollars.

Woods Hole,  
Mass.  
Little Harbor.

Improving Buzzards Bay, Massachusetts: By removing Weepeket rock in accordance with the report submitted in House Document Numbered One hundred and sixty-four, Fifty-eighth Congress, second session, two thousand five hundred dollars.

Buzzards  
Bay, Mass.

Improving Merrimac River, Massachusetts: Continuing improvement, forty thousand dollars; and the Secretary of War shall cause an examination to be made with a view to providing a channel twelve feet deep between the mouth of the river and the falls above the city of

Merrimac  
River, Mass.

	Haverhill, also including in such examination rocks and other obstructions at the mouth of said river.
Mystic and Malden rivers, Mass.	Improving Mystic and Malden rivers, Massachusetts, and Mystic River below the mouth of Island End River: Continuing improvement and for maintenance, fifty thousand dollars.
Town River, Mass.	Improving Town River, Massachusetts: Completing improvement, nine thousand eight hundred and twenty-seven dollars and forty-one cents.
Weymouth Fore River, Mass.	Improving Weymouth Fore River, Massachusetts, in accordance with the report submitted in House Document Numbered Thirty-six, Fifty-eighth Congress, second session: Completing improvement, fifty-seven thousand five hundred dollars: <i>Provided</i> , That no part of this sum shall be expended until the Secretary of War shall have received satisfactory assurance that the improvement of that portion of the Weymouth River which lies above the improvement herein mentioned, and of the Town River, except so much as is herein provided for, shall hereafter be maintained by the State of Massachusetts, or other agency, without expense to the Government of the United States.
Proviso. Restriction.	
Taunton River, Mass.	Improving Taunton River, Massachusetts: For maintenance, five thousand dollars.
Point Judith, R. I.	Improving Point Judith harbor of refuge, Rhode Island, one hundred thousand dollars: <i>Provided</i> , That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated: <i>Provided further</i> , That the amounts herein appropriated and authorized, with any existing balances on hand to the credit of such improvement, shall be applied in extending the easterly or shore arm of the breakwater and continuing it to the shore, with a view of providing a shelter for a landing place for the passengers, crews, and cargoes of vessels in distress, and other vessels, and for the lifeboats of the Point Judith life-saving service.
Breakwater, etc.	
Block Island, R. I.	Improving harbor of refuge at Block Island, Rhode Island: Completing improvement, fifty thousand dollars.
Great Salt Pond, Block Island, R. I.	Improving harbor at Great Salt Pond, Block Island, Rhode Island: Continuing improvement and for maintenance, thirty thousand dollars, which amount the Secretary of War may, in his discretion, expend for extending the south jetty and dredging.
Point Judith Pond, R. I.	Improving the entrance to Point Judith Pond, Rhode Island, in accordance with the report submitted in House Document Numbered Sixty, Fifty-eighth Congress, second session, two thousand dollars, which, together with the unexpended balances of previous appropriations, shall be applied to the extension of the jetties or in dredging, as the Secretary of War may deem most beneficial.

Improving Providence River and Harbor, Narragansett Bay, and Green Jacket Shoal, Rhode Island, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate four hundred and seven thousand seven hundred and seventy-eight dollars, exclusive of the amounts herein and heretofore appropriated.

Providence River and Harbor, Narragansett Bay, and Green Jacket shoal, R. I.  
*Proviso.*  
Contracts.

Improving Pawcatuck River, Rhode Island and Connecticut, and Little Narragansett Bay, by the removal of obstructions near Watch Hill, one thousand dollars.

Pawcatuck River and Little Narragansett Bay, R. I. and Conn.

Improving Pawtucket River, Rhode Island, in accordance with the plan contained in House Document Numbered One hundred and thirteen, Fifty-sixth Congress, first session, thirty thousand dollars.

Pawtucket River, R. I.

Improving harbor at New London, Connecticut: For maintenance, two thousand dollars.

New London, Conn.

Improving Duck Island harbor of refuge, Connecticut: For maintenance, six thousand dollars.

Duck Island, Conn.

Improving harbor at Branford, Connecticut: Continuing improvement and for maintenance, three thousand dollars.

Branford, Conn.

Improving harbor at New Haven, Connecticut: For maintenance, nine thousand dollars.

New Haven, Conn.

Improving harbor at Milford, Connecticut: Continuing improvement, ten thousand dollars.

Milford, Conn.

Improving harbor at Bridgeport, Connecticut: For maintenance, ten thousand dollars.

Bridgeport, Conn.

Improving harbors at Norwalk, Five-mile River, Stamford, Southport, and Greenwich, Connecticut: Continuing improvement and for maintenance, forty-four thousand dollars.

Harbors from Housatonic River to New York State line.

Improving Thames River, Connecticut: Completing improvement, thirty-four thousand one hundred dollars.

Thames River, Conn.

Improving Connecticut River below Hartford, Connecticut: Continuing improvement and for maintenance, forty thousand dollars.

Connecticut River, Conn.

Improving Housatonic River, Connecticut: Continuing improvement and for maintenance, ten thousand dollars.

Housatonic River, Conn.

Improving channel from New Haven Harbor, via Oyster Point and Kimberly Avenue Bridge, in West River, Connecticut, in accordance with the report submitted in House Document Numbered Seventy-three, Fifty-eighth Congress, second session: Completing improvement, thirty-eight thousand five hundred dollars.

New Haven, Conn.  
Channel.

Improving harbor at Port Chester, New York: For maintenance, three thousand dollars.

Port Chester, N. Y.

Improving harbor at Mamaroneck, New York: For maintenance, two thousand dollars.

Mamaroneck, N. Y.

Improving harbor at Larchmont, New York: Continuing improvement, five thousand dollars.

Larchmont, N. Y.

Echo Bay, N. Y. Improving harbor at Echo Bay, New York: The Secretary of War is hereby authorized to cause an examination to be made of Long rock, near the entrance to Echo Bay, and if the interests of commerce demand, he may, in his discretion, cause the removal of such rock, and any amount heretofore appropriated for Echo Bay improvement, and now unexpended, may be used for such removal.

Harbors, north shore Long Island, N. Y. Improving harbors at Port Jefferson, Mattituck, Huntington, Glencove, Flushing Bay, Canarsie Bay, and Sag Harbor, New York: Continuing improvement and for maintenance, sixty-two thousand five hundred dollars.

Great South Bay, N. Y. Improving Great South Bay, New York: For maintenance, two thousand dollars.

Saugerties, N. Y. Improving harbor at Saugerties, New York: Continuing improvement and for maintenance, five thousand dollars, and the Chief of Engineers may, upon application, permit the extension of the channel from the point at which the present project terminates up to a point six hundred feet below the dam in Esopus Creek: *Provided*, That the plan of improvement shall be first submitted to the said Chief of Engineers and approved by him, and no part of this appropriation shall be expended therefor.

Rondout and Peekskill, N. Y. Improving harbors at Rondout and Peekskill, New York: Continuing improvement and for maintenance, seventeen thousand five hundred dollars, of which amount fifteen thousand dollars shall be expended upon the harbor at Rondout.

New York Harbor. Improving New York Harbor: For maintenance, seventy-five thousand dollars.

North River, N. Y. Removal of obstruction in North River, New York: The Secretary of War may cause to be removed the rock or obstruction in North River, New York Harbor, near pier numbered one [<sup>a</sup>], to a depth of forty feet at mean low tide; and for such removal he is hereby authorized to divert a sum not exceeding twenty thousand dollars from the amounts heretofore appropriated or authorized for the improvement of Ambrose channel in said harbor, in addition to the amounts heretofore diverted or appropriated for such removal.

Buffalo, N. Y. Improving harbor at Buffalo, New York: For maintenance, one hundred and fifty thousand dollars.

Black Rock Harbor, N. Y. Improving Black Rock Harbor and channel, New York: For improvement in accordance with the report contained in House Document Numbered Four hundred and twenty-eight, Fifty-eighth Congress, second session, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute such project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate six hundred thousand dollars, in addition to the sum herein appropriated: *Provided further*, That

*Provisos.*  
Contracts.

<sup>a</sup> Known also as Pier A.



no portion of the amount herein provided shall be expended until the Secretary of War shall have satisfactory assurance of the construction of the barge canal projected by the State of New York: *And provided further*, That the Secretary of War shall report as to whether any portion of the expense of the improvement proposed by said House document ought in equity to be borne by the abutting owners of the property along which such improvements are to be made, in consideration of any special benefits derived by such property owners through such improvements.

Barge canal.

Report.

Improving harbor at Charlotte, New York: Continuing improvement and for maintenance, eighty thousand dollars.

Charlotte,  
N. Y.

Improving harbor at Little Sodus Bay, New York: Continuing improvement and for maintenance, thirty thousand dollars.

Little Sodus  
Bay, N. Y.

Improving harbor at Oswego, New York: Continuing improvement and for maintenance, in accordance with plan "b," page six, of House Document Numbered Fifty-five, Fifty-eighth Congress, second session, one hundred thousand dollars.

Oswego, N. Y.

Improving harbor at Cape Vincent, New York: Continuing improvement, thirty thousand dollars.

Cape Vincent,  
N. Y.

Improving harbor at Ogdensburg, New York: For maintenance, fifteen thousand dollars.

Ogdensburg,  
N. Y.

Improving Arthur Kill, and the waters connecting Raritan Bay with New York Harbor, New York, and New Jersey: For maintenance, ten thousand dollars.

Arthur Kill,  
N. Y. (Staten  
Island-New  
Jersey chan-  
nel).

Improving Bronx River and East Chester Creek, New York: Continuing improvement and for maintenance, twenty-four thousand five hundred dollars.

Bronx River  
and East Ches-  
ter Creek, N. Y.

Improving East River and Hell Gate, New York: Continuing improvement, two hundred thousand dollars.

East River  
and Hell Gate,  
N. Y.

Improving Harlem River, New York: Continuing improvement, seventy-five thousand dollars.

Harlem  
River, N. Y.

Improving Newtown Creek, New York: For maintenance, five thousand dollars.

Newtown  
Creek, N. Y.

Improving Browns Creek, New York: Continuing improvement and for maintenance, three thousand dollars.

Browns  
Creek, N. Y.

Improving Hudson River, New York: Continuing improvement and for maintenance, two hundred and thirteen thousand three hundred dollars: *Provided*, That of the sum herein appropriated eighty-five thousand dollars, or so much thereof as may be necessary, may, in the discretion of the Secretary of War, be expended for the removal of Stonehouse bar, opposite New Baltimore, and not exceeding ten thousand dollars in providing a channel for access to the harbor at Tarrytown, New York, in accordance with the report submitted in House Document Numbered Two hundred and eighty-three, Fifty-sixth Congress, first session.

Hudson  
River, N. Y.Proviso.  
Stonehouse  
bar.

Stone pier at Piermont.	The Secretary of War is authorized and directed to cause an examination to be made of the existing stone pier at Piermont, with a view to determining whether the same should be removed in the interest of navigation.
Wappinger Creek, N. Y.	Improving Wappinger Creek, New York: Continuing improvement and for maintenance, three thousand dollars.
Raritan Bay, N. J.	Improving Raritan Bay, New Jersey: For maintenance, fifty thousand dollars.
Passaic River, N. J.	Improving Passaic River, New Jersey: Completing improvement and for maintenance, forty thousand dollars.
Woodbridge Creek, N. J.	Improving Woodbridge Creek, New Jersey: Continuing improvement and for maintenance, six thousand dollars.
Keyport Harbor, Mattawan Creek, Raritan River, etc., N. J.	Improving Keyport Harbor, Mattawan Creek, Raritan, South, and Elizabeth rivers, Shoal Harbor and Compton Creek, and Cheesequake Creek, New Jersey: Continuing improvement and for maintenance, fifty thousand dollars.
Shrewsbury River, N. J.	Improving Shrewsbury River, New Jersey: Continuing improvement and for maintenance, twenty thousand dollars.
Alloway Creek, N. J.	Improving Alloway Creek, New Jersey: Continuing improvement and for maintenance, three thousand dollars.
Tuckerton Creek, N. J.	Improving Tuckerton Creek, New Jersey: Continuing improvement and for maintenance, twelve thousand dollars; and the Secretary of War may, in his discretion, direct that the plan heretofore adopted for this improvement may be modified: <i>Provided</i> , That the cost of completion shall not exceed the estimate heretofore made for the completion of such improvement.
<i>Proviso.</i> Limit of cost.	
Raccoon Creek, N. J.	Improving Raccoon Creek, New Jersey: Continuing improvement, fifteen thousand dollars.
Erie, Pa.	Improving harbor at Erie, Pennsylvania: Continuing improvement and for maintenance, one hundred and twenty-five thousand dollars.
Pittsburg, Pa.	Improving harbor at Pittsburg, Pennsylvania: For maintenance, ten thousand dollars.
Monongahela River, Pa.	Improving Monongahela River, Pennsylvania, by the acquisition of necessary land and construction of necessary improvements at locks and dams numbered five and six, seven thousand eight hundred and fifty dollars.
Allegheny River, Pa. Locks and dams. Contracts.	Improving locks and dams at Herr Island, head of Six-Mile Island, and at Springdale, Allegheny River, Pennsylvania: A contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said locks and dams, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred and eighty-one thousand two hundred and twenty-six dollars and sixty-three cents, exclusive of the amounts heretofore appropriated.
Delaware River, Pa., N. J., and Del.	Improving Delaware River, Pennsylvania, New Jersey, and Delaware: Continuing improvement, five hundred thousand dollars: <i>Provided</i> , That a contract or contracts
<i>Proviso.</i> Contracts.	



may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said improvement, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one million dollars, exclusive of the amounts herein and heretofore appropriated.

Improving Monongahela River, Lock and Dam Numbered Three, Pennsylvania, in accordance with the report submitted in House Document Numbered Two hundred and nine, Fifty-eighth Congress, second session, two hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said lock and dam, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate three hundred and eighty-nine thousand one hundred and ninety-six dollars, exclusive of the amounts herein and heretofore appropriated.

Monongahela  
River, Pa.  
Lock and  
Dam No. 3.

*Proviso.*  
Contracts.

Improving harbor at Wilmington, Delaware: Continuing improvement and for maintenance, up to Third Street Bridge, twenty-five thousand dollars, in addition to the amounts heretofore appropriated, which are hereby made available and the restrictions upon the expenditure of which are hereby removed.

Wilmington,  
Del.

Improving Appoquinnimink, Murderkill, and Mispillion rivers, Delaware: Continuing improvement and for maintenance, twenty thousand dollars.

Appoquinnimink,  
Murderkill, and Mispillion  
rivers,  
Del.

Improving Smyrna River, Delaware: Completing improvement and for maintenance, in accordance with the plan submitted in House Document Numbered Ninety, Fifty-sixth Congress, second session, five thousand three hundred and sixty-five dollars; and the Secretary of War may, in his discretion, modify the plan of improvement recommended in said House document, by the substitution of a cut-off from the mouth of Mill Creek to the bend above Brick Store Landing in lieu of the lower cut-off: *Provided*, That such modification shall not increase the total cost estimated for the completion of such improvement: *Provided further*, That no part of said amount shall be expended until a satisfactory title to the land required for crosscuts and other portions of this improvement shall be obtained without expense to the United States.

Smyrna River,  
Del.

*Provisos.*  
Limit to cost.

Title.

Improving harbors at Rockhall, Queenstown, Claiborne, and Cambridge; and Chester, Choptank, Warwick, Pocomoke, La Trappe, and Manokin rivers, and Tyaskin (Wetipquin) Creek, Maryland, east shore: Continuing improvement and for maintenance, forty-four thousand dollars.

Chesapeake  
Bay, Md.  
Eastern  
shore.

Improving Breton Bay, Maryland: Continuing improvement, six thousand dollars.

Breton Bay,  
Md.

Improving Patapsco River and channel to Baltimore, Maryland: Continuing improvement in accordance with

Patapsco  
River, Md.  
Channel to  
Baltimore.

<i>Provisos.</i> Contracts.	the revised estimates submitted in House Document Numbered One hundred and eighty-six, Fifty-seventh Congress, second session, and for maintenance, two hundred and fifty thousand dollars: <i>Provided</i> , That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one million dollars, exclusive of the amounts herein and heretofore appropriated: <i>Provided further</i> , That the Secretary of War may, in his discretion, expend said amount in obtaining an increased uniform depth from the city of Baltimore to deep water beyond York Spit.
Increased uniform depth to beyond York Spit, Chesapeake Bay.	
Elk River, Md.	Improving Elk River, Maryland: For maintenance, two thousand dollars.
Susquehanna River above Havre de Grace, Md.	Improving Susquehanna River, above and below Havre de Grace, Maryland: Continuing improvement, ten thousand dollars.
Nanticoke River, Del. and Md.	Improving Nanticoke River, Delaware and Maryland: Continuing improvement and for maintenance, two thousand dollars.
Wicomico River, Md.	Improving Wicomico River <sup>a</sup> , Maryland: Continuing improvement and for maintenance, five thousand dollars.
Potomac River, Washington, D. C.	Improving Potomac River at Washington, District of Columbia, by maintenance of existing channels, for the purpose of navigation, fifty thousand dollars.
Potomac River below Washington, D. C. Norfolk, Va.	Improving Potomac River below Washington, District of Columbia: For maintenance, ten thousand dollars.
	Improving Norfolk Harbor and its approaches, Virginia: Continuing improvement and for maintenance, forty thousand dollars, of which amount twenty thousand dollars, or so much thereof as may be necessary, may, in the discretion of the Secretary of War, be expended for the removal of Pinners Point.
Cape Charles City, Va.	Improving harbor at Cape Charles City, Virginia: Continuing improvement and for maintenance, twenty-five thousand dollars.
York, Occoquan, Mattaponi, etc., rivers, Va.	Improving York, Occoquan, Mattaponi, and Pamunkey rivers, and Carters Creek, Virginia: Continuing improvement and for maintenance, twenty-eight thousand dollars.
Nomini Creek, Va.	Improving Nomini Creek, Virginia: Continuing improvement, four thousand dollars.
Rappahannock River, Va.	Improving Rappahannock River, Virginia: Continuing improvement and for maintenance, forty thousand dollars; and the Secretary of War may cause a survey of said river to be made at and below Fredericksburg with a view to determining whether any change should be made in the existing plans for improvement. In case any modification shall be deemed advisable the amount herein appropriated may be expended upon the project as modi-

<sup>a</sup> On the eastern shore.

fied: *Provided*, That the total cost shall not exceed the amount estimated for the completion of the existing project. *Proviso.*  
Maximum  
cost.

Improving Urbana Creek, Virginia: Continuing improvement, ten thousand dollars.

Improving James River, Virginia: Continuing improvement, two hundred thousand dollars, of which fifty thousand dollars shall be expended in the construction of a turning basin in accordance with the project submitted in House Document Numbered Two hundred and thirty-four, Fifty-sixth Congress, first session, the cost to complete the same not to exceed one hundred and fifty thousand dollars. James River,  
Va.

Improving Appomattox River, Virginia: For maintenance, ten thousand dollars. Appomattox  
River, Va.

Improving Pagan River, Virginia: The Secretary of War may, in his discretion, expend the balance remaining to the credit of said improvement, with a view to securing a channel width of not less than forty feet and such depth as may be obtained without exceeding said balance. Pagan River,  
Va.

Improving Little Kanawha River, West Virginia: For maintenance, one thousand dollars. Little Kana-  
wha River, W.  
Va.

Improving Little Kanawha River, West Virginia, in accordance with the report submitted in House Document Numbered Three hundred and nine, Fifty-eighth Congress, second session, one hundred and sixty-three thousand dollars: *Provided*, That no part of said amount shall be expended unless the franchises and improvements in said river belonging to the Little Kanawha Navigation Company can be purchased, and a complete and satisfactory title vested in the United States, at a cost not exceeding seventy-five thousand dollars, to be paid from the amount herein appropriated. *Proviso.*  
Little Kana-  
wha Naviga-  
tion Company.

Improving harbor at Beaufort, North Carolina: For maintenance, two thousand dollars. Beaufort,  
N. C.

Improving Beaufort Inlet, North Carolina, in accordance with the report submitted in House Document Numbered Five hundred and sixty-three, Fifty-eighth Congress, second session, with a view to securing a channel twenty feet deep, forty-five thousand dollars. Beaufort In-  
let, N. C.

Improving inland waterway from Norfolk Harbor, Virginia, to the sounds of North Carolina<sup>a</sup>: For maintenance, three thousand dollars. Norfolk, Va.,  
to sounds of  
North Caro-  
lina, etc.

Improving inland water route from Norfolk, Virginia, to Albemarle Sound, North Carolina, through Currituck Sound: Continuing improvement and for maintenance, twenty-two thousand dollars.

Improving Roanoke River, North Carolina: Continuing improvement, ten thousand dollars. Roanoke Riv-  
er, N. C.

Improving Perquimans River, North Carolina, at and near Hertford, in accordance with the report submitted Perquimans  
River, N. C.

<sup>a</sup> Via Pasquotank River.

	in House Document Numbered Three hundred and two, Fifty-eighth Congress, second session: Completing improvement, eleven thousand two hundred and fifty dollars.
Scuppernon River, N. C.	Improving Scuppernon River, North Carolina: Completing improvement and for maintenance, five thousand dollars.
Pamlico and Tar rivers, N. C.	Improving Pamlico and Tar rivers, North Carolina: Completing improvement and for maintenance, eight thousand dollars.
Contentnea Creek, N. C.	Improving Contentnea Creek, North Carolina: For maintenance, one thousand dollars.
Neuse and Trent rivers, N. C.	Improving Neuse and Trent rivers, North Carolina: Continuing improvement and for maintenance, forty thousand dollars.
Fishing Creek, N. C.	Improving Fishing Creek, North Carolina: Continuing improvement, five hundred dollars.
New River, N. C.	Improving New River, North Carolina: The Secretary of War may, in his discretion, expend the balance of funds now available to the credit of this improvement, or so much thereof as may be necessary, in rebuilding the dike heretofore constructed in connection therewith.
Northeast and Black rivers, and Cape Fear River, N. C.	Improving Northeast and Black rivers and Cape Fear River above Wilmington, North Carolina: For maintenance, nine thousand dollars.
Cape Fear River, N. C.	Improving Cape Fear River at and below Wilmington, North Carolina: Continuing improvement and for maintenance, one hundred and fifty thousand dollars: <i>Provided</i> , That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said improvement, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate three hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated: <i>Provided further</i> , That the Secretary of War may cause an examination to be made of said improvement, with a view to determining whether any modifications therein are desirable.
Provisos. Contracts.	
Modifications.	
Winyah Bay, S. C.	Improving Winyah Bay, South Carolina: For maintenance, ten thousand dollars.
Charleston, S. C.	Improving harbor at Charleston, South Carolina: Continuing improvement and for maintenance, twenty-five thousand dollars: <i>Provided</i> , That the Secretary of War may, in his discretion, cause the dredges employed in this work to be utilized, at such times as they are not employed in dredging on the outer bar, for dredging in the channels between said outer bar and the city of Charleston.
Proviso. Dredges.	
Waccamaw River, N. C., and Little Pedee River, S. C.	Improving Waccamaw River, North Carolina and South Carolina, and Little Pedee River, South Carolina: Continuing improvement and for maintenance, fifteen thousand dollars.
Great Pedee River, S. C.	Improving Great Pedee River, South Carolina: For maintenance, five thousand dollars.
Santee, Wateree, Congaree rivers, etc., S. C.	Improving Santee, Wateree, and Congaree rivers, and the Estherville-Minim Creek Canal, South Carolina: Con-

tinuing improvement and for maintenance, fifty thousand dollars, and the Secretary of War may expend upon such improvement the unexpended balance of the appropriation heretofore made for a lock and dam in the Congaree River provided for by the Act of March third, eighteen hundred and ninety-nine. Vol. 30, p. 1137.

Improving the inland waterway between Charleston and Beaufort, including Wappoo Cut, South Carolina: Continuing improvement and for maintenance, twenty thousand dollars. Water route from Charleston to Beaufort, S. C.

Improving harbor at Savannah, Georgia: Continuing improvement and for maintenance, seventy-five thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred and ten thousand dollars, exclusive of the amounts herein and heretofore appropriated. Savannah, Ga.  
Proviso.  
Contracts.

Improving harbor at Brunswick, Georgia: Continuing improvement and for maintenance, forty thousand dollars: *Provided*, That of the amount herein appropriated five thousand dollars, or so much thereof as may be necessary, may be used for maintaining in Academy Creek, immediately in front of and adjacent to the wharves thereof, to the old Altamaha Canal, a depth equal to the controlling depth on the shoals at the lower end of the city in East River: *Provided further*, That no money shall be expended inside harbor lines heretofore or hereafter established in said Academy Creek, and the Secretary of War is authorized and directed to cause a survey to be made of Brunswick Harbor with a view to securing a depth on the outer bar equal to the controlling depth in the inner harbor, and maintaining the depths over said bar and in said harbor. Brunswick, Ga.  
Provisos.  
Academy Creek.  
Expenditures restricted, etc.

Improving Cumberland Sound, Georgia and Florida: For maintenance, thirty thousand dollars. Cumberland Sound, Ga. and Fla.

Improving Savannah River, Georgia: Continuing improvement and for maintenance, fifteen thousand dollars, of which amount two thousand dollars may, in the discretion of the Secretary of War, be expended on said river above Augusta, Georgia. Savannah River above Augusta, Ga.

Improving Altamaha River, Georgia: Continuing improvement and for maintenance, ten thousand dollars. Altamaha River, Ga.

Improving Oconee River, Georgia: Continuing improvement and for maintenance, fifteen thousand dollars, three thousand dollars of which may be used to clean out said river from Georgia Railroad bridge to the northern boundary of Green County, Georgia. Oconee River, Ga.

Improving Ocmulgee River, Georgia: Continuing improvement and for maintenance, fifteen thousand dollars, of which amount five thousand dollars may be used for maintenance and repairs of works at and near Macon. Ocmulgee River, Ga.



Water route, Savannah, Ga., to Fernandina, Fla.	Improving inside water route from Savannah, Georgia, to Fernandina, Florida: Completing improvement and for maintenance, forty-one thousand dollars.
Skidaway Narrows, Ga.	Improving Skidaway Narrows, Georgia, in accordance with the report submitted in House Document Numbered Four hundred and fifty, Fifty-eighth Congress, second session, and for maintenance, twenty thousand dollars.
Flint River, Ga.	Improving Flint River, Georgia: Continuing improvement and for maintenance, twenty thousand dollars.
Chattahoo- chee River, Ga. and Ala.	Improving Chattahoochee River, Georgia and Alabama, below Columbus, Georgia: Continuing improvement and for maintenance, seventy-five thousand dollars.
Coosa River, Ga. and Ala.	Improving Coosa River, Georgia and Alabama, between Rome, Georgia, and Lock Numbered Four, Alabama: For maintenance, twenty-five thousand dollars.
Key West, Fla.	Improving harbor at Key West, Florida, and the entrance thereto: Continuing improvement and for maintenance, fifty thousand dollars.
Sarasota Bay, Fla.	Improving Sarasota Bay, Florida: Continuing improvement and for maintenance, five thousand dollars.
Hillsboro Bay, Fla.	Improving Hillsboro Bay, Florida, in accordance with the report submitted in House Document Numbered Three hundred and six, Fifty-eighth Congress, second session, with a view to obtaining a depth of twenty feet from the lower bay to the mouth of Hillsboro River, one hundred thousand dollars: <i>Provided</i> , That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said portion of the project recommended in said report, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate three hundred and forty-eight thousand three hundred and fifty dollars, exclusive of the amounts herein and heretofore appropriated: <i>Provided further</i> , That such improvement shall not include that portion of the said project located in Hillsboro River.
Proviso. Contracts.	
Restriction.	
Tampa Bay, Fla.	Improving Tampa Bay, Florida: The Secretary of War may expend the balance remaining to the credit of said improvement with a view to securing a channel depth of twenty-six feet, with sufficient width: <i>Provided</i> , That no part of said balance on hand shall be expended unless the dock company or companies owning docks, wharves, or terminals at Tampa Bay shall, by valid contract, agree that the wharfage charges at such terminals shall be submitted to the Secretary of War and be subject to his approval.
Proviso. Wharfage charges.	
Carrabelle bar, East Pass, Fla.	Improving East Pass and Carrabelle bar and harbor, Florida: Continuing improvement, fifteen thousand dollars.
Apalachicola Bay, Fla.	Improving Apalachicola Bay, Florida: Continuing improvement and for maintenance, forty thousand dollars, which amount, or so much thereof as may be necessary, shall be expended with a view to completing the channel over the outer bar and in Link channel.

Improving harbor at Pensacola, Florida: Continuing improvement and for maintenance, one hundred thousand dollars.

Pensacola, Fla.

Improving Blackwater and Upper East bays, and Blackwater River, Florida, from Milton to the mouth, in accordance with the report submitted in House Document Numbered One hundred and ninety-three, Fifty-eighth Congress, second session, ten thousand dollars.

Blackwater and upper East bays, and Blackwater River, Fla.

Improving Saint Johns River, Florida: Continuing improvement and for maintenance, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate three hundred and nine thousand seven hundred and fifty dollars, exclusive of the amounts herein and heretofore appropriated.

St. Johns River, Fla.

*Proviso.*  
Contracts.

Improving Saint Johns River, Florida, at Orange Mills Flats: Continuing improvement, twenty-five thousand dollars.

Orange Mills Flats, Fla.

Improving Volusia bar, Florida: For maintenance, two thousand dollars.

Volusia bar, Fla.

Improving Oklawaha River, Florida: Continuing improvement and for maintenance, two thousand dollars.

Oklawaha River, Fla.

Improving Indian River, between Goat Creek and Jupiter Inlet, Florida: Continuing improvement and for maintenance, twenty thousand dollars, and the Secretary of War shall cause a survey to be made of Sebastian Inlet.

Indian River, Fla.

Improving Kissimmee River<sup>a</sup>, Florida: Continuing improvement and for maintenance, seven thousand dollars.

Kissimmee River, Fla.

Improving Orange River, Charlotte Harbor, and Caloosahatchee River, Florida: For maintenance, three thousand dollars.

Orange River, Charlotte Harbor, Caloosahatchee River, Fla.

Improving Crystal, Anclote, Suwanee, and Withlacoochee rivers, Florida: Continuing improvement and for maintenance, forty thousand dollars, of which amount the sum of fifteen thousand dollars each may be expended on the Crystal and Withlacoochee, and five thousand dollars each on the Anclote and Suwanee rivers.

Crystal, Anclote, Suwanee, and Withlacoochee rivers, Fla.

Improving Manatee River, Florida, in accordance with the report submitted in House Document Numbered One hundred and seventeen, Fifty-eighth Congress, second session, ten thousand dollars.

Manatee River, Fla.

For the removal of the water hyacinth from the navigable waters of the State of Florida so far as it is or may become an obstruction to navigation, twenty-five thousand dollars: *Provided*, That no chemical process injurious to cattle which may feed upon the water hyacinth shall be used.

Florida. Removal of water hyacinth.

*Proviso.*  
Injurious chemical process.

<sup>a</sup> The adopted project provides for the improvement also of Istokpoga Creek, which empties into Kissimmee River about 10½ miles north of Fort Bassinger.



Apalachicola River, etc., Fla.	Improving Apalachicola River, Florida, including the Cut-Off, and the lower Chipola River, also the upper Chipola River from Marianna to its mouth: Continuing improvement and for maintenance, twelve thousand dollars.
Choctawhatchee River, Fla.	Improving Choctawhatchee River, Florida and Alabama: Continuing improvement and for maintenance, ten thousand dollars, of which amount six thousand dollars shall be expended between Newton and Geneva, Alabama, and four thousand dollars for dredging the channel at Cypress Top outlet of said river.
Holmes River, Fla.	Improving Holmes River, Florida, from Vernon to its mouth: Continuing improvement and for maintenance, two thousand dollars.
Escambia and Conecuh rivers, Fla. and Ala.	Improving Escambia and Conecuh rivers, Florida and Alabama: For maintenance, ten thousand dollars.
Mobile, Ala.	Improving harbor at Mobile, Alabama: Continuing improvement and for maintenance, two hundred thousand dollars: <i>Provided</i> , That not more than ten thousand dollars of such amount may, in the discretion of the Secretary of War, be used in the removal of dead heads, sunken logs, and other obstructions arising from the freshets on the rivers entering into Mobile Bay: <i>Provided further</i> , That the Secretary of War may cause a survey and estimate to be made of the cost of dredging and deepening the said channel to a depth of twenty-seven feet, the said channel to have a clear bottom width throughout of one hundred feet, with appropriate side slopes.
Provisos. Maximum.	
Dredging, etc., channel.	
Mobile bar, Ala.	Improving Mobile Bar, Alabama, with a view to deepening and widening the channel near Fort Morgan, fifty thousand dollars.
Louis M. Tisdale.	That Louis M. Tisdale, his heirs or assigns, be, and is hereby, granted the right of way through the waters of the United States, to enable him, his heirs or assigns, to construct and operate a ship canal or channel from a point on Mon Louis Island, Mobile County, State of Alabama, through Mobile Bay to the deep-water basin in Mobile Bay between Fort Morgan and Fort Gaines, Alabama, with power and authority to construct and maintain all necessary harbors, locks, dams, channel dikes, levees, and piers without expense to the United States: <i>Provided</i> , That the Secretary of War shall first approve the plans for such canal or channel, and that the same shall in no manner interfere with or affect the usual and ordinary navigation of said waters; and that Mobile Bay or the channel between the same and Mississippi Sound shall in no way be thereby closed to navigation: <i>Provided</i> , That, in the transportation of military or naval stores, troops, or munitions of war of the United States, no toll shall be charged; and that the tolls or tonnage charges by said Louis M. Tisdale, his heirs or assigns, shall be fixed, from time to time, by the Secretary of War: <i>Provided</i> , That vessels of five tons burden and less
Granted right of way for ship canal.	
Mon Louis Island to deep-water basin, Mobile Bay, Ala.	
Provisos. Secretary of War to approve plans, etc.	
Toll.	
Exemption.	

shall be exempt from tolls for the use of said canal when they do not pass through the lock; and that no tolls shall be charged on any boats or vessels navigating any of the waters in the said canal or channel which could have been navigated by such vessels had not such canal been built: *Provided further*, That this franchise shall not be effective unless said Louis M. Tisdale, his heirs or assigns, shall in good faith commence such construction within two years from the passage of this Act, and shall complete the same within five years. Congress reserves the right to alter, amend or repeal any of the provisions of this Act in so far as it relates to this franchise.

Time of construction.

Amendment.

Improving Alabama River, Alabama: Continuing improvement and for maintenance, one hundred thousand dollars; which amount the Secretary of War is authorized and directed to expend, with a view to obtaining, as nearly as possible, a continuous channel of a depth not less than four feet by open-channel work.

Alabama River, Ala.

Improving Black Warrior, Warrior, and Tombigbee rivers, Alabama, by the construction of locks and dams numbered one and two in the Tombigbee River, and the completion of lock and dam numbered one, in the Tombigbee River near Demopolis, and those numbered two and three in the Warrior River next above, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete the construction of said locks and dams, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate seven hundred and eighty-one thousand four hundred and sixty-six dollars, exclusive of the amounts herein and heretofore appropriated: *Provided further*, That the Secretary of War may expend a portion of the amount herein appropriated or authorized of not more than forty thousand dollars for the construction of a dredge and of not more than thirty thousand dollars for the construction of lock houses necessary for the operation of locks and dams in said rivers.

Black Warrior, Warrior, and Tombigbee rivers, Ala.

Provisos. Contracts.

Maximum expenditure for dredge, etc.

Improving Tombigbee River, Alabama, from the mouth to Demopolis: For maintenance, fifteen thousand dollars.

Tombigbee River from mouth to Demopolis, Ala.

Improving Tombigbee River from Demopolis, Alabama, to Columbus, Mississippi: For maintenance, twelve thousand dollars; of which amount the Secretary of War may, in his discretion, expend a sum not exceeding two thousand dollars for improving said river between Columbus and Walkers Bridge, Mississippi.

From Demopolis, Ala., to Columbus, Miss.

Improving harbor at Biloxi, Mississippi: For maintenance, nine thousand dollars.

Biloxi, Miss.

Improving Horn Island Pass, Mississippi, with a view to obtaining a channel twenty-one feet in depth and three hundred feet in width across the outer bar, two hundred feet wide elsewhere, in accordance with the report submitted in House Document Numbered Five hundred and six, Fifty-eighth Congress, second session, forty thousand

Horn Island Pass, Miss. Channel.

- Proviso.*  
*Contracts.* four hundred and eighty dollars: *Provided*, That a contract or contracts can be made at a sum not to exceed the unit price of eleven cents per cubic yard, or such work can be performed by Government dredge.
- Pascagoula River, Miss. Improving Pascagoula River<sup>a</sup>, Mississippi: Continuing improvement and for maintenance, one hundred and fifty thousand dollars.
- Pascagoula and Leaf rivers, Miss. Improving Pascagoula<sup>b</sup> and Leaf rivers, Mississippi: For maintenance, twelve thousand dollars: *Provided*, That two thousand dollars of said amount may be expended on the Chickasahay River between the mouth and Bucatunna.
- Proviso.*  
Chickasahay River. Improving Pearl River, Mississippi, below Rockport: Continuing improvement and for maintenance, seven thousand dollars.
- Pearl River, Miss., below Rockport. Improving Pearl River, Mississippi, between Edinburg and Jackson: For maintenance, four thousand dollars.
- Between Edinburg and Jackson, Miss. Improving Homochitto River, Mississippi: For maintenance, two thousand dollars.
- Homochitto River, Miss. Improving Yazoo, Tallahatchie, Coldwater, and Big Sunflower rivers, and Tchula Lake, Mississippi: Continuing improvement and for maintenance, one hundred and five thousand dollars.
- Yazoo, etc., rivers, Miss. Improving the mouth and passes of Calcasieu River, Louisiana: Continuing improvement and for maintenance, one hundred thousand dollars.
- Calcasieu River, La. Improving Bayou Plaquemine, Grand River, and Pigeon Bayous, Louisiana: For maintenance, thirty-five thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete the improvement in Bayou Plaquemine, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred thousand dollars, exclusive of the amounts heretofore appropriated.
- Bayou Plaquemine, etc., La. Improving Bayou Teche, Louisiana: For maintenance, seven thousand five hundred dollars, and the Secretary of War shall cause a resurvey to be made of the project submitted in House Document Numbered Sixty-nine, Fifty-fifth Congress, first session.
- Proviso.*  
*Contracts.* Bayou Teche, La. Improving Chefuncte River, Bogue Falia, Tickfaw River and tributaries, also Amite River and Bayou Manchac, Louisiana: For maintenance, six thousand five hundred dollars.
- Chefuncte River, etc., La. Improving the channel, bay, and passes of Bayou Vermillion, and Mermentau River and tributaries, Louisiana: For maintenance, three thousand dollars.
- Bayou Vermillion, etc., La. For the removal of the water hyacinth from the navigable waters in the States of Texas and Louisiana, so far as it is or may become an obstruction to navigation, forty thousand dollars.
- Texas and Louisiana. Removal of water hyacinth.

<sup>a</sup> From a point on Dog River 3 miles above its mouth to Mississippi Sound.

<sup>b</sup> Above mouth of Dog River.

Improving Red River in the States of Louisiana, Arkansas, and Texas and Indian Territory: For continuing improvement and for maintenance, two hundred thousand dollars: *Provided*, That of this amount one hundred thousand dollars may be expended between Fulton, Arkansas, and Denison, Texas: *Provided further*, That of the amount herein appropriated for improvement below Fulton fifteen thousand dollars may, in the discretion of the Secretary of War, be spent in the improvement of the channel at Alexandria, Louisiana.

Red River,  
La., Ark., Tex.,  
and Ind. T.

*Provisos.*  
Fulton and  
Denison.  
Channel at  
Alexandria, La.

Improving Bayou Bartholomew, Boeuf River, Tensas River, and Bayou Maçon, and Bayous D'Arbonne and Corney, Louisiana and Arkansas: For maintenance, seventeen thousand dollars.

Bayou Bar-  
tholomew,  
Boeuf River,  
etc., La. and  
Ark.

Improving Sabine Pass, Texas and Louisiana: Continuing improvement and for maintenance, one hundred and fifty thousand dollars.

Sabine Pass,  
Tex. and La.

Improving the mouth of the Brazos River, Texas: Continuing improvement, fifty thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate eighty-seven thousand five hundred dollars, exclusive of the amounts herein and heretofore appropriated.

Brazos Riv-  
er, Tex.  
*Proviso.*  
Contracts.

Improving Aransas Pass, Texas: Continuing improvement, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated: *Provided further*, That the amounts herein appropriated and authorized shall be applied to the completion of the project in accordance with the design and specifications of the Aransas Pass Harbor Company, and in continuation of the work heretofore done, and to such additional work as may be necessary for strengthening the jetty.

Aransas  
Pass, Tex.  
*Provisos.*  
Contracts.

Restriction.

Improving Galveston Harbor, Texas: Continuing improvement and for maintenance, two hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said improvement, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred and fifty thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Galveston,  
Tex.

*Provisos.*  
Contracts.

Improving Galveston channel, Texas: Continuing improvement, one hundred and seventy-five thousand dollars: *Provided*, That the Secretary of War may, in his discretion, use not to exceed one hundred and twenty-five

Dredge.

<p>Diversion of appropriation.</p>	<p>thousand dollars of said amount to purchase or build a dredge for use in said channel: <i>Provided further</i>, That the Secretary of War may, in his discretion, divert the sum of fifty thousand dollars from the amounts appropriated and authorized for improving Galveston Harbor, Texas, and apply it to this improvement.</p>
<p>Galveston ship channel, etc., Tex.</p>	<p>Improving Galveston ship channel and Buffalo Bayou, Texas: Continuing improvement to a point at or near the head of Long Reach, in accordance with the modification of the original project as recommended in the report of the Board of Engineers for Rivers and Harbors of date December fifteenth, nineteen hundred and four, two hundred thousand dollars: <i>Provided</i>, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, as modified by said report, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated: <i>Provided further</i>, That the amount on hand is hereby made available for the project as modified by said report.</p>
<p>Provisos. Contracts.</p>	
<p>Unexpended balance available.</p>	
<p>West Galveston Bay channel, etc., Tex.</p>	<p>Improving West Galveston Bay channel, Double Bayou, and mouths of adjacent streams, Texas, including Trinity River Anahuac channel and Cedar Bayou: Continuing improvement, fifty thousand dollars.</p>
<p>Brazos River, Tex., Velasco to Old Washington.</p>	<p>Improving Brazos River, Texas, from Velasco to Old Washington: Continuing improvement, twenty-five thousand dollars.</p>
<p>Old Washington to Waco, Tex. Channel.</p>	<p>Improving Brazos River, Texas, from Old Washington to Waco: The Secretary of War is authorized and directed to cause an examination of this section of the river with a view of determining whether four or six months' navigation can be secured to Waco at a reasonable cost by any method other than by locks and dams, and if not the least number of locks and dams that will furnish such navigation, and in the event it should appear feasible to secure four or six months' navigation by open-channel work or by not to exceed nine locks and dams the Secretary of War may expend for the improvement of said river an amount not to exceed seventy-five thousand dollars, which amount under the conditions named is hereby appropriated.</p>
<p>Maximum expenditure.</p>	
<p>Trinity River, Tex.</p>	<p>Improving Trinity River, Texas: The balance now available for the construction of locks and dams between the mouth of the river and section one is hereby diverted from said purpose and made available for the construction of locks and dams numbered one, four, and six in section one, in accordance with the report submitted in House Document Numbered Four hundred and nine, Fifty-sixth Congress, first session: <i>Provided</i>. That the Secretary of War is authorized to enter into a contract or contracts for the completion of said locks and dams, numbered one, four, and six, to be paid for as appropria-</p>
<p>Provisos. Contracts.</p>	



tions may from time to time be made by law, not to exceed in the aggregate one hundred and sixty-one thousand two hundred and eighty-seven dollars, exclusive of the amount herein diverted and made available for the said construction: *Provided further*, That none of the amount made available herein or authorized to be contracted for herein shall be expended unless the citizens of Dallas shall pay over to the Secretary of War the sum of sixty-six thousand dollars, which sum, if paid over, shall be applied to the construction of dams in said section one, at Old River and Parsons Slough, for the easing of bends and for the improvement of said section: *And provided further*, That the Secretary of War may, in his discretion, construct locks and dams numbered two or three or five instead of number four, should he determine that navigation would be better subserved thereby.

Restriction  
on expenditure.

Locks and  
dams.

Improving mouths of Sabine and Neches rivers, Texas, in accordance with the report submitted in House Document Numbered Six hundred and thirty-four, Fifty-eighth Congress, second session, by connecting the same with Taylors Bayou, or a point in Sabine Lake near to the mouth of said bayou, by a channel at or near the west shore of Sabine Lake; the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate four hundred and eleven thousand five hundred dollars, exclusive of the amounts heretofore appropriated: *Provided*, That the channel may, in the discretion of the Secretary of War, be constructed through the land near the lake for any part of said route: *Provided further*, That the right of way is furnished without expense to the United States.

Sabine and  
Neches rivers,  
Tex.  
Improving  
mouth.

Proviso.  
Channel.

Right of way.

Cypress Bayou, Texas: The available balance on hand may, in the discretion of the Secretary of War, be expended in cleaning and clearing the bayou and lakes between Jefferson, Texas, and Mooringsport, Louisiana. And the Secretary of War is authorized and directed to survey Cypress Bayou and the channels connecting Shreveport, Louisiana, with Jefferson, Texas, including an examination of the falls near Little Pass.

Cypress Bay-  
ou, Tex.

Survey.

Improving Ouachita and Black rivers, Arkansas and Louisiana: Continuing improvement and for maintenance, eighty thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to complete the locks and dams in the Ouachita River, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate forty thousand three hundred and twelve dollars, exclusive of the amounts herein and heretofore appropriated.

Ouachita and  
Black rivers,  
Ark. and La.  
Proviso.  
Contracts.

Improving Arkansas River, Arkansas: For maintenance, thirty-five thousand dollars.

Arkansas  
River, Ark.

- Red Fork levee.** For repair of revetment work and bank protection in the vicinity of Red Fork Levee, Arkansas River, thirty thousand dollars, provided it is required in the interest of navigation.
- Repairs.**
- White River, Ark.** Improving White River, Arkansas: For maintenance, fifteen thousand dollars.
- Upper White River, Ark.** Improving Upper White River, Arkansas: Continuing improvement by the construction of Lock and Dam Numbered Three, one hundred and sixty thousand dollars; and the Secretary of War shall cause an examination to be made by a board of engineers to report upon the desirability of the construction of further locks and dams in said river.
- Lock and dam.**
- Cache River, Ark.** Improving Cache River, Arkansas: For maintenance, two thousand dollars.
- Black and Current rivers, Ark. and Mo.** Improving Black and Current rivers, Arkansas and Missouri: For maintenance, eighteen thousand dollars.
- St. Francis and L'Anguille rivers, Ark.** Improving Saint Francis and L'Anguille rivers, Arkansas: For maintenance, six thousand dollars.
- Oblon and Forked Deer rivers, Tenn.** Improving Oblon and Forked Deer rivers, Tennessee: For maintenance, three thousand dollars.
- Cumberland River below Nashville, Tenn.** Improving Cumberland River, Tennessee, below Nashville: For maintenance, ten thousand dollars.
- Above Nashville, Tenn. and Ky.** Improving Cumberland River, Tennessee and Kentucky, above Nashville: For maintenance, ten thousand dollars, and for completion of lock and dam numbered two above Nashville, forty thousand dollars, and the balance on hand to the credit of the Cumberland River above Nashville for general improvement and for locks Numbered five, six, and seven shall be applied upon the construction of said lock and dam.
- Lock and Dam No. 21.** For the construction of Lock and Dam Numbered Twenty-one in said river, seventy-four thousand dollars:
- Provisos. Contracts.** *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete the said lock and dam, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated: *Provided further*, That the balance remaining to the credit of the Cumberland River on any project therein above said lock and dam numbered twenty-one shall be made applicable for the construction thereof.
- Use of balance.**
- Cumberland River Improvement Company.** Improving the upper Cumberland and South Fork rivers, above Burnside, Kentucky: The Cumberland River Improvement Company, a corporation formed and existing under the laws of the State of Kentucky, is authorized and permitted to improve the Cumberland River and its tributaries, including the South Fork, above Burnside, Kentucky, at its own expense, by the construction of necessary locks and dams, under the supervision and pursuant to plans to be submitted to and approved by the
- May construct locks and dams above Burnside, Ky.**



Secretary of War, and the power generated by the construction of such locks and dams may be utilized by such company for commercial and other purposes, under the following express provisions:

Use of power.

That the use of such power shall in no instance impede or hinder navigation;

Unobstructed navigation.

That the locks and dams shall be at least equal in size and capacity to other locks and dams constructed on the Cumberland River;

Size of locks. etc.

That they shall be open to all purposes of navigation by the general public, subject to the payment of uniform, reasonable rates of toll by all parties using such waterway, which rates of toll shall be fixed from time to time by the Secretary of War, and shall at no time produce an income greater than six per centum, cumulative interest, on the investment in such locks and dams, after deducting the cost of maintenance and operation, reckoned from the beginning, and based on the total initial cost; such locks and dams to be kept and maintained by such corporation without expense to the Government: *Provided further*,

Open to navigation.

That this franchise shall not be effective unless said corporation shall commence in good faith the construction of such improvement within eighteen months after the completion and operation of lock and dam numbered twenty-one on said river, and shall afford a permanent navigable stage, within the next succeeding five years, of at least six feet in depth, by means of such locks and dams, to the mouth of Rock Castle River;

Toll.

*Proviso.*  
Time of construction, etc.

That said corporation shall file with the Secretary of War, before beginning its construction of such lock and dam, a suitable bond, to be approved by him, conditioned to pay all reasonably prospective damages arising from trespass or overflow or other injury to private rights;

Bond.

That the right to collect tolls shall cease at the expiration of forty years from the date of completion of lock and dam numbered twenty-one on said river, and that upon the ceasing of the right to collect tolls the United States may assume the possession, care, operation, maintenance, and management of the lock or locks so constructed, without compensation to any person or persons or corporation, but without in any way impairing the right or ownership of the water power and dams created by said corporation, which shall continue the care and maintenance of such dams without interference on the part of the United States;

Collection of tolls.  
Time limit.

Operation, maintenance, etc.

Congress reserves the right to alter, amend, or repeal any of the provisions of this Act in so far as it relates to this franchise.

Amendment.

Improvement of Tennessee River, Tennessee, above Chattanooga: Continuing improvement and for maintenance, fifty thousand dollars, of which amount not more than five thousand dollars may, in the discretion of the Secretary of War, be expended in the improvement of Little Tennessee River.

Tennessee River above Chattanooga.

Colbert and  
Bee Tree  
shoals.  
*Proviso.*  
Contracts.

Improving Tennessee River: Continuing improvement at Colbert and Bee Tree Shoals by the construction of a lateral canal, two hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary for the prosecution of said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Hobbs Is-  
land to Gun-  
tersville, Ala.

Improving Tennessee River from Hobbs Island to Guntersville, Alabama: Continuing improvement and for maintenance, fifteen thousand dollars.

Scott Point.  
Lock gates.

Improving Tennessee River, Tennessee: Continuing improvement by the partial construction of lock gates at the lock projected at or near Scotts Point, together with the cost of superintendence and the preparation of plans to be made by the United States, ten thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary for the further prosecution of said work, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate forty thousand dollars exclusive of the amount herein appropriated.

*Proviso.*  
Contracts.

Below Riv-  
erton.

Improving Tennessee River, Tennessee, below River-ton: Continuing improvement and for maintenance, thirty thousand dollars.

French Broad  
and Little Pig-  
eon rivers,  
Tenn.

Improving French Broad and Little Pigeon rivers, Tennessee: For maintenance, two thousand dollars.

Clinch and  
Hiwassee riv-  
ers, Tenn.

Improving Clinch and Hiwassee rivers, Tennessee: Continuing improvement and for maintenance, six thousand dollars.

Big Sandy  
River, etc., W.  
Va. and Ky.

Improving Big Sandy River and Tug and Levisa forks, West Virginia and Kentucky: For maintenance and for improving the mouth of the Big Sandy, forty-three thousand dollars.

Falls of the  
Ohio River,  
Louisville, Ky.

Improving the Falls of the Ohio River at Louisville, Kentucky: For maintenance and alteration of the existing dam, eighty thousand dollars.

Green River,  
Ky.

Improving Green River, Kentucky, above the mouth of Big Barren River: Continuing improvement and for maintenance, five thousand dollars: *Provided*, That the Secretary of War may, in his discretion, expend such portion of said amount as may be necessary for the removal of snags in Nolin River.

*Proviso.*  
Nolin River.

Kentucky  
River.  
Reimburse-  
ment to Clark  
County, Ky.,  
etc.

Improving Kentucky River, Kentucky: The Secretary of War may, in his discretion, use so much of the funds heretofore appropriated for the improvement of said river as may be necessary to repay the county court of Clark County, Kentucky, the reasonable cost expended by it in constructing the county bridge across Two Mile Creek, in Clark County, Kentucky, and to repair the

damage to the county road caused by the construction of Lock and Dam Numbered Ten at Ford, Kentucky.

Kentucky River, Kentucky: Continuing improvement by the construction of Lock and Dam Numbered Twelve, fifty thousand dollars.

Improving harbor at Toledo, Ohio: For maintenance, twenty thousand dollars. Toledo, Ohio.

Improving harbor at Port Clinton, Ohio: For maintenance, two thousand dollars. Port Clinton, Ohio.

Improving harbor at Sandusky, Ohio: Continuing improvement and for maintenance, one hundred and twenty-five thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said improvement, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate four hundred and eighty thousand dollars, exclusive of the amounts herein and heretofore appropriated: *Provided further*, That from the adopted project there shall be omitted the rock dredging near to the wharves at Sandusky Harbor, except that portion thereof which is included in a contract or contracts already made. Sandusky, Ohio.

*Proviso.*  
Contracts.

*Provided further*, That from the adopted project there shall be omitted the rock dredging near to the wharves at Sandusky Harbor, except that portion thereof which is included in a contract or contracts already made. Dredging.

Improving harbor at Huron, Ohio, in accordance with the report submitted in House Document Numbered One hundred and twenty-two, Fifty-eighth Congress, second session, sixty-eight thousand five hundred dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete the said improvement, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated. Huron, Ohio.

*Proviso.*  
Contracts.

Improving harbor at Vermilion, Ohio: For maintenance, fifteen thousand dollars. Vermilion, Ohio.

Improving harbor at Lorain, Ohio: Completing improvement and for maintenance, eighty-five thousand dollars. Black River (Lorain), Ohio.

Improving harbor at Cleveland, Ohio: Continuing improvement and for maintenance, two hundred thousand dollars. Cleveland, Ohio.

Improving harbor at Fairport, Ohio: Continuing improvement and for maintenance, one hundred and thirty-five thousand dollars: *Provided*, That the Secretary of War may in his discretion, cause the westerly arm of the breakwater in said harbor to be extended to a point at or near the shore, the expense thereof to be paid from the appropriations herein and heretofore made. Fairport, Ohio.

*Proviso.*  
Breakwater.

Improving harbor at Ashtabula, Ohio: Continuing improvement and for maintenance, twenty thousand dollars; and the unexpended balance on hand to the credit of said improvement, or so much thereof as may be necessary, may be expended by the Secretary of War for the extension of the westerly arm of the breakwater in said Ashtabula, Ohio.

harbor to a point at or near the shore, in accordance with the recommendation of the Chief of Engineers.

**Conneaut, Ohio.** Improving Conneaut Harbor, Ohio: Continuing improvement and for maintenance, sixty thousand dollars.

**Muskingum River, Ohio.** Improving Muskingum River, Ohio: Continuing improvement, eight thousand dollars.

**Lock and Dam No. 11.** Improving Muskingum River, Ohio: For the rebuilding of lock and dam numbered eleven in said river, one hundred and ten thousand dollars: *Provided*, That no part of the said amount shall be expended unless the Secretary of War shall have satisfactory assurance that the State of Ohio, or other agency, will expend a sum of not less than two hundred thousand dollars upon that part of the Ohio Canal system which connects the said river above the lock mentioned with Lake Erie.

**Proviso. Expenditures upon Ohio Canal.**

**Ohio River. Provisos.** Improving Ohio River: General improvement, three hundred thousand dollars: *Provided*, That from said amount the Secretary of War may, in his discretion, expend from the amount herein appropriated a sum sufficient for the following, or either of them, namely, to remove the rocks in the channel of said river or canal near to the Falls at Louisville, Kentucky, for the dredging of Pool Numbered Six in said river, and for necessary dredging in said river at and near Middleport, Ohio: *Provided further*, That the unexpended balance of funds available for the construction of an ice pier at or near the mouth of Big Hocking River may, in the discretion of the Secretary of War, be expended toward the completion of an ice pier at Maysville, Kentucky.

**Falls at Louisville, Ky. Pool, Dam No. 6. Middleport, Ohio. Ice pier, Maysville, Ky.**

**Canalization. Appointment of Board of Engineers authorized.** The Secretary of War is hereby authorized and directed to appoint a board of engineers to examine the Ohio River, and report at the earliest date by which a thorough examination can be made, the necessary data with reference to the canalization of the river, and the approximate location and number of locks and dams in such river, with a view both to a depth of six feet and nine feet; and in said report shall include the probable cost of such improvement with each of the depths named, the probable cost of maintenance, and the present and prospective commerce of said river, upstream as well as downstream having regard to both local and through traffic. They shall also report whether, in their opinion, such improvement should be made, and whether other plans of improvement could be devised under which the probable demands of traffic, present and prospective, could be provided for without additional locks and dams, or with a less number than is described in surveys heretofore made, giving general details relating to all of said plans and the approximate cost of completion thereof. They shall also examine the said river from the mouth of the Green River to Cairo, with a view to determining whether an increased depth can be maintained by use of dredges.

**Duties.**

**Report.**

**Mouth of Green River to Cairo. Depth of channel.**

**Locks and Dams Nos. 2, 3, 4, 5, and 6.** Improving Ohio River in the State of Pennsylvania: By the completion of locks and dams numbered two,

three, four, and five, and the modification of said locks and dams and of lock and dam numbered six so as to secure a stage of nine feet in the pools belonging thereto, five hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary for the completion of said improvement, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one million two hundred and eighty-one thousand three hundred and seventy-six dollars, exclusive of the amounts herein and heretofore appropriated.

*Proviso.*  
*Contracts.*

Improving Ohio River in Ohio and West Virginia: By the completion of locks numbered eight and eleven, one hundred and sixty thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete the said locks, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and sixty thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Locks Nos. 8  
and 11.

*Proviso.*  
*Contracts.*

Improving Ohio River, with a view to the construction of lock and dam numbered nineteen, one hundred thousand dollars; and for purchase of site for lock and dam numbered twenty-six, thirty-five thousand dollars: *Provided*, That no part of said amounts shall be expended until the survey of the Ohio River herein provided for shall have been completed and such project as may be recommended on consideration and review of the same shall be adopted by Congress: *Provided further*, That in case said locks and dams are not provided for by Congress, the amounts herein appropriated shall revert to the general fund for the improvement of the Ohio River.

Lock and  
Dam No. 19.

*Provisos.*  
*Survey, etc.*

Reversion of  
appropriation.

Improving harbor at Ontonagon, Michigan: For maintenance, three thousand dollars.

Ontonagon,  
Mich.

Improving harbor at Marquette, Michigan: For maintenance, three thousand dollars.

Marquette,  
Mich.

Improving harbor at Marquette Bay, Michigan, harbor of refuge: For maintenance, one thousand dollars.

Marquette  
Bay, Mich.

Improving harbor at Grand Marais, Michigan, harbor of refuge: Continuing improvement and for maintenance, fifty thousand dollars.

Grand Ma-  
rais, Mich.

Improving harbor at Gladstone, Michigan, in accordance with the report submitted in House Document Numbered One hundred and sixty-five, Fifty-eighth Congress, second session, fourteen thousand dollars.

Gladstone,  
Mich.

Improving harbor at Manistique, Michigan, in accordance with the report submitted in House Document Numbered Four hundred and twenty-nine, Fifty-eighth Congress, second session, twenty-five thousand dollars.

Manistique,  
Mich.

Improving harbor at Saint Joseph, Michigan: Continuing improvement and for maintenance, fifteen thousand dollars.

St. Joseph.  
Mich.



**South Haven, Mich.** Improving harbor at South Haven, Michigan, in accordance with the report submitted in House Document Numbered One hundred and nineteen, Fifty-eighth Congress, second session, fifty thousand dollars: *Provided*, That no portion of such amount shall be used, except for maintenance of existing channels, until proper dock lines shall have been established and suitable bulkheads shall have been built along these lines by the city of South Haven, or by the riparian owners, and the property lying on the channel side of these dock lines shall have been deeded to the United States, free of cost, all pursuant to the plan of improvement recommended in said House document.

**Proviso. Channels.**

**Saugatuck Harbor and Kalamazoo River, Mich.** Improving Saugatuck Harbor and Kalamazoo River, Michigan: Continuing improvement and for maintenance, seventy-five thousand dollars.

**Holland (Black Lake), Mich.** Improving harbor at Holland, Black Lake, Michigan: Continuing improvement and for maintenance, sixty-five thousand dollars: *Provided*, That the Secretary of War may enter into a contract or contracts for such materials and work as may be necessary for the prosecution of said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and ten thousand dollars, exclusive of the amounts herein and heretofore appropriated: *Provided further*, That the United States engineer in charge may, subject to the approval of the Chief of Engineers, modify the existing project by the widening of the harbor entrance.

**Provisos. Contracts.**

**Modification.**

**Grand Haven, Mich.** Improving harbor at Grand Haven, Michigan: Continuing improvement and for maintenance, thirty thousand dollars.

**Muskegon, Mich.** Improving harbor at Muskegon, Michigan: Continuing improvement and for maintenance, one hundred thousand dollars.

**Pentwater and White Lake, Mich.** Improving harbors at Pentwater and White Lake, Michigan: For maintenance, twenty thousand dollars.

**Ludington, Mich.** Improving harbor at Ludington, Michigan: For maintenance, ten thousand dollars.

**Harbors of Ludington, Mich., Manitowoc, etc., Wis.** The Secretary of War is hereby authorized to appoint a board of engineers to inquire into the effect of wave action as injuriously affecting the harbors at Ludington, Michigan, and Manitowoc, Two Rivers, Racine, Kenosha, and Sheboygan, Wisconsin, and to report at the earliest practical date what plan of improvement it is desirable to adopt to overcome such wave action. Such board shall further investigate and report as to whether, in the interests of economy, future repairs and construction of piers in such harbors and in those similarly situated should be made of cement or other permanent substance.

**Investigation of wave action on.**

**Repairs, etc.**

**Manistee, Mich.** Improving harbor at Manistee, Michigan: For maintenance, ten thousand dollars.

Improving harbor at Frankfort, Michigan: Continuing improvement and for maintenance, twenty thousand dollars. Frankfort,  
Mich.

Improving harbor at Charlevoix and entrance to Pine Lake, Michigan: Continuing improvement and for maintenance, twenty-five thousand dollars. Charlevoix,  
etc., Mich.

Improving harbor at Petoskey, Michigan: Continuing improvement and for maintenance, twenty thousand dollars. Petoskey,  
Mich.

Improving harbor at Arcadia, Michigan, in accordance with the report submitted in House Document Numbered One hundred and ninety-four, Fifty-eighth Congress, second session, six thousand dollars. Arcadia,  
Mich.

The Secretary of War is hereby authorized and directed to transfer to Lake Michigan the dredge heretofore constructed for the harbors on the easterly shore of said lake for use in such harbors. Dredge.

Improving harbor at Cheboygan, Michigan: For maintenance, seven thousand five hundred dollars. And the Secretary of War is hereby authorized to cause an examination of such harbor to be made, with a view to ascertaining the desirability, in the interest of commerce, of extending the works of improvement up to the lock and dam in the Cheboygan River, and whether, if such extension is made, any portion of the expense of such extension should be borne by the city of Cheboygan or by persons whose property may be benefited thereby. Cheboygan,  
Mich.

Improving harbor of refuge, Harbor Beach, Michigan: Continuing improvement and for maintenance, two hundred thousand dollars. The Secretary of War is hereby authorized to cause an examination to be made with a view to ascertaining what other or further works of improvement are necessary, if any, in order to make such harbor of refuge suitable for the present demands of commerce. Harbor  
Beach (for-  
merly Sand-  
beach), Mich.

Improving waterway across Keweenaw Point, from Keweenaw Bay to Lake Superior, Michigan: Continuing improvement, forty-five thousand dollars. Water route  
across Kewee-  
naw Point,  
Mich.

Improving Grand River, Michigan, in accordance with the report submitted in House Document Numbered Two hundred and sixteen, Fifty-eighth Congress, second session, one hundred thousand dollars: *Provided*, That no portion of the money herein appropriated shall be used in providing a turning basin in the city of Grand Rapids. Grand River,  
Mich.

Improving Saginaw River, Michigan: Continuing improvement and for maintenance, thirty thousand dollars; and any sums heretofore appropriated for the improvement of the Flint, Shiawassee, and Bad rivers, and now unexpended, are hereby diverted and made available for the improvement of the Saginaw River, in addition to the sum herein appropriated. Saginaw  
River, Mich.

Improving Sebewaing River, Michigan: For maintenance, five thousand dollars. Diversion of  
appropriation.

Improving Sebewaing River, Michigan: For maintenance, five thousand dollars. Sebewaing  
River, Mich.



Rouge River  
and Monroe  
Harbor, Mich.

Improving Rouge River and Monroe Harbor, Michigan: Continuing improvement and for maintenance, thirteen thousand dollars.

Clinton River,  
Mich.

Improving Clinton River, Michigan: For maintenance, three thousand dollars.

St. Marys  
River, at falls,  
Mich.

*Proviso.*  
Contracts.

Improving Saint Marys River, at the falls, Michigan: Continuing improvement, four hundred and twenty thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary for the prosecution of said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate six hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Hay Lake  
and Neebish  
channels.

*Proviso.*  
Contracts.

Improving Hay Lake and Neebish channels, Saint Marys River, Michigan: Continuing improvement, five hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary for the prosecution of said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate seven hundred and fifty thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Detroit River,  
Mich.

Improving Detroit River, Michigan: The Secretary of War may enter into a contract or contracts for such materials and work as may be necessary to prosecute said improvement, in accordance with the report submitted in House Document Numbered Forty, Fifty-eighth Congress, third session, to be paid for as appropriation may from time to time be made by law, not to exceed in the aggregate four hundred thousand dollars, exclusive of the amounts heretofore appropriated.

Menominee  
Harbor and  
River, Wls.

Menominee Harbor and River, Michigan and Wisconsin: The Secretary of War is hereby authorized to make such modifications of the existing project as may seem best to save expense and subserve the interests of commerce.

Kenosha,  
Wls.

Improving harbor at Kenosha, Wisconsin: Continuing improvement and for maintenance, five thousand dollars.

Racine, Wls.

Improving harbor at Racine, Wisconsin: Continuing improvement and for maintenance, thirty thousand dollars.

Milwaukee,  
Wls.

Improving harbor at Milwaukee, Wisconsin, including harbor of refuge: Continuing improvement and for maintenance, including the repair and rebuilding of the breakwater belonging to the harbor of refuge, one hundred and fifty thousand dollars; and the so-called "Fair Weather" opening in said breakwater shall not be closed except by direction of Congress.

Improving said harbor in accordance with the report submitted in House Document Numbered One hundred and twenty, Fifty-eighth Congress, second session, one

hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred and eighteen thousand five hundred and eighty-one dollars, exclusive of the amount herein appropriated: *Provided further*, That no part of the appropriation herein made shall be expended for the purpose named unless the Secretary of War shall have satisfactory assurance that the city of Milwaukee will comply with the conditions imposed upon said municipality as set forth and contained in paragraph twenty-eight of House Document Numbered One hundred and twenty, Fifty-eighth Congress, second session.

*Provisos.*  
Contracts.

Restriction.

Improving harbor at Sheboygan, Wisconsin: Continuing improvement and for maintenance, eighteen thousand dollars.

Sheboygan,  
Wis.

Improving harbor at Manitowoc, Wisconsin: For maintenance, one hundred and ten thousand dollars.

Manitowoc,  
Wis.

Improving harbor at Two Rivers, Wisconsin: Continuing improvement and for maintenance, six thousand six hundred dollars, and the Secretary of War is authorized and directed to cause a survey to be made of the entrance channel to said harbor with a view to obtaining depths of sixteen and eighteen feet, respectively.

Two Rivers,  
Wis.

Improving harbor at Kewaunee, Wisconsin: For maintenance, three thousand dollars.

Kewaunee,  
Wis.

Improving Sturgeon Bay and Lake Michigan Ship Canal, Wisconsin, and harbor of refuge connected therewith: The Secretary of War is hereby directed to ascertain and determine whether for the purpose of completing the project submitted in House Document Numbered One hundred and seventeen, Fifty-sixth Congress, second session, it is necessary to remove, relocate, or change the bridge across Sturgeon Bay at the city of Sturgeon Bay, and if so, whether and to what extent the owners thereof have acquired vested or other rights in its present location, so as to entitle them to damages by such removal, relocation, or change, and in case the said Secretary of War shall determine that such removal, relocation, or change is necessary to complete said project, and that the said owners have acquired vested or other rights in the present location of said bridge, he is hereby authorized and directed to acquire, by condemnation or otherwise, such property as may be necessary, and the sum of fifty thousand dollars, or so much thereof as may be necessary, is hereby appropriated for that purpose.

Sturgeon Bay  
and Lake  
Michigan Ship  
Canal, Wis.

Improving harbor at Green Bay, Wisconsin: For maintenance, ten thousand dollars.

Green Bay,  
Wis.

Improving harbor at Ashland, Wisconsin: For maintenance, sixty thousand dollars.

Ashland,  
Wis.

- Portwing, Wis.** Improving harbor at Port Wing, Wisconsin: Completing improvement and for maintenance, nineteen thousand nine hundred and ninety-two dollars.
- Fox River, Wis.** Improving Fox River, Wisconsin: Continuing improvement, thirty-five thousand dollars.
- Grand Marais, Minn.** Improving harbor at Grand Marais, Minnesota: For maintenance, two thousand dollars.
- Agate Bay, Minn.** Improving harbor at Agate Bay, Minnesota: For maintenance, two thousand dollars.
- Warroad Harbor and River, Minn.** Improving Warroad Harbor, Warroad River, Minnesota, by dredging a channel one hundred feet wide and seven feet deep from the inner end of the channel dredged in nineteen hundred and four to the boat landing at Warroad, with a turning channel for boats at the inner harbor, and continuing present improvement, thirty-five thousand dollars.
- Duluth, Minn., and Superior, Wis.** Improving harbor at Duluth, Minnesota, and Superior, Wisconsin: Continuing improvement and for maintenance, two hundred and seventy thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate three hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated.
- Minnesota River, Minn.** Improving Minnesota River, Minnesota, at the mouth: For maintenance and dredging channel, three thousand dollars.
- Red River of the North, Minn. and N. Dak.** Improving Red River of the North, Minnesota and North Dakota: Continuing improvement and for maintenance, nine thousand dollars.
- St. Croix River, Minn. and Wis.** Improving Saint Croix River, Minnesota and Wisconsin: For maintenance, four thousand dollars.
- Michigan City, Ind.** Improving harbor at Michigan City, Indiana: Continuing improvement and for maintenance, forty-five thousand dollars: *Provided*, That the Secretary of War may, in his discretion, use any part of this appropriation or of any appropriation hereafter made for the maintenance or improvement of said harbor, for the construction of a turning basin in the inner harbor, not exceeding, however, the sum of twenty-five thousand dollars in the aggregate.
- Chicago, Ill.** Improving harbor at Chicago, Illinois: Continuing improvement and for maintenance, two hundred thousand dollars.
- Waukegan, Ill.** Improving harbor at Waukegan, Illinois: For maintenance, thirty thousand dollars.
- Illinois and Mississippi Canal, Ill.** Improving Illinois and Mississippi Canal, Illinois: Continuing improvement and for maintenance, three hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary for the
- Proriso.*  
Contracts.

completion of said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Improving Calumet River, Illinois and Indiana: For improving said river in accordance with the report submitted in House Document Numbered One hundred and seventy-two, Fifty-eighth Congress, second session, and for maintenance, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary for the prosecution of said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and seventy-six thousand dollars, exclusive of the amounts herein and heretofore appropriated. And the Secretary of War is hereby authorized to accept, in his discretion, deeds from the proper parties conveying to the United States, free of expense, such lands as may be necessary for the construction of any of the turning basins proposed in said House document.

Calumet Riv-  
er, Ill. and  
Ind.

*Proviso.*  
Contracts.

Improving Rock River, Illinois: A fixed dam with movable crest at or near Sterling, Illinois, in lieu of the lock and dam already provided for may, in the discretion of the Secretary of War, be constructed: *Provided*, That said fixed dam with movable crest may be constructed from the funds already appropriated, or authorized to be appropriated, for the construction of the Illinois and Mississippi Canal, and shall constitute a part of the project for said canal.

Rock River,  
Ill.

*Proviso.*  
Fixed dam,  
etc.

Mississippi River in Minnesota: Improving reservoirs at the headwaters of the Mississippi River by the renewal of the Pine River dam according to existing project, the completion of Pokegama Dam, the purchase of lands or easements for Winnibigoshish, Leech Lake, Pokegama, and Pine River dams, and the improvement of the channel from Brainerd to Grand Rapids, Minnesota, one hundred and sixty thousand dollars, to be expended, together with the amounts now on hand to the credit of "Reservoirs at the headwaters of the Mississippi," for the completion of the improvements herein mentioned.

Mississippi  
River, Minn.  
Reservoirs.

Improving Mississippi River, Minnesota: Locks and dams numbered one and two, between Saint Paul and Minneapolis: A contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete the said locks and dams, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred and ninety-nine thousand five hundred and forty-three dollars, exclusive of the amounts heretofore appropriated.

Locks and  
Dams Nos. 1  
and 2.  
Contracts.

Between Mis-  
souri River  
and St. Paul,  
Minn.  
Contracts.

Improving Mississippi River between Missouri River and Saint Paul, Minnesota: A contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said improvement, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate three hundred thousand dollars, exclusive of the amounts heretofore appropriated, which amount may be expended during the year beginning July first, nineteen hundred and six, and the sum of eleven thousand five hundred dollars may be expended from amounts now or hereafter available for this improvement for the purpose of completing the harbor of refuge on the east shore of Lake Pepin, Minnesota, and the Secretary of War may cause an estimate to be made of the cost of securing a channel six feet deep in that portion of the river above described.

Lake Pepin,  
Minn.

Moline, Ill.

Proviso.  
Contracts.

Improving Mississippi River at Moline, Illinois: In accordance with the report submitted in House Document Numbered Three hundred and ninety-seven, Fifty-eighth Congress, second session, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to complete said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred and eighty-six thousand dollars, exclusive of the amounts herein appropriated.

From mouth  
of Ohio to  
mouth of Mis-  
souri.  
Dredges.

Improving the Mississippi River from the mouth of the Ohio River to and including the mouth of the Missouri River: The Secretary of War may prosecute the improvement of the said section of the Mississippi River by dredging, as set forth in the report of the Board of Engineers for rivers and harbors, submitted November twelfth, nineteen hundred and three; and the said Secretary of War may purchase or cause to be constructed two dredges, to be employed with those now in use in said section for the purpose of dredging; and the said Secretary may, in his discretion, expend a portion of the balance now remaining on hand to the credit of said improvement for the completion of works already under way or for the construction of other works which will be useful in promoting the navigation of said section of the river; and such balance as remains on hand, together with the amount authorized to be expended in pursuance of contracts to be made, is hereby made available for the purposes set forth in this item.

Mississippi  
River Com-  
mission.  
Head of  
Passes to  
mouth of Ohio.  
Expenses, etc.

Improving the Mississippi River from the Head of the Passes to the mouth of the Ohio River, including salaries, clerical, official, traveling and miscellaneous expenses of the Mississippi River Commission: Continuing improvement, one million dollars, which shall be expended under the direction of the Secretary of War in accordance with



the plans, specifications, and recommendations of the Mississippi River Commission as approved by the Chief of Engineers for the general improvement of the river, for the building of levees, and for surveys, including the survey from the Head of the Passes to the headwaters of the river, in such manner as in their opinion shall best improve navigation and promote the interests of commerce at all stages of the river: *Provided*, That on and after the passage of this Act a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to carry on continuously the plans of the Mississippi River Commission as aforesaid, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two million dollars, exclusive of the amounts herein and heretofore appropriated, which latter amount may be expended during the year beginning July first, nineteen hundred and six: *Provided further*, That the money hereby appropriated and authorized to be expended, in pursuance of contracts or otherwise, or so much thereof as may be necessary, shall be expended in the construction of suitable and necessary dredge boats and other devices and appliances and in the maintenance and operation of the same, with the view of ultimately obtaining and maintaining a navigable channel from Cairo down not less than two hundred and fifty feet in width and nine feet in depth at all periods of the year, except when navigation is closed by ice: *And provided further*, That the water courses connected with said river, and the harbors upon it, now under the control of the Mississippi River Commission and under improvement, may, in the discretion of said Commission, upon approval by the Chief of Engineers, receive allotments for improvements now under way or hereafter to be undertaken, to be paid for from the amounts herein appropriated or authorized.

*Proviso.*  
Contracts.

Dredge  
boats.

Channel be-  
low Cairo.

Allotments  
for improve-  
ment.

South Pass  
channel.  
Contracts.

Improving Mississippi River, South Pass channel: A contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary for the maintenance of said channel, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate fifty thousand dollars, exclusive of the amounts heretofore provided by law.

Improving Osage River, Missouri: Continuing improvement and for maintenance, eighty thousand dollars.

Osage River,  
Mo.

Improving Gasconade River, Missouri: Continuing improvement and for maintenance, fifteen thousand dollars.

Gasconade  
River, Mo.

Continuing improvement Missouri River at Saint Joseph, Missouri, and protecting work already done, all new work to conform to the established harbor line, fifty thousand dollars, provided the same is required in the interest of navigation: *Provided, further*, That no work shall be done at Saint Joseph until the public authorities shall contribute toward defraying the expense of said

Missouri  
River.  
St. Joseph,  
Mo.

*Proviso.*  
Contribution  
to fund.

work an additional fifty thousand dollars, making the sum so contributed subject to the order of the Secretary of War in such manner as he may direct, so that the expense of any work done under the provisions of this Act shall be borne equally by the Government and out of the contribution herein provided for.

Between  
mouth and  
Sioux City,  
Iowa.

Improving Missouri River: General improvement by snagging and maintenance of open channel work, one hundred and seventy-five thousand dollars, of which amount ninety thousand dollars may be expended between the mouth and Sioux City, Iowa; ten thousand dollars for improvements at Hermann, Missouri, and seventy-five thousand dollars above Sioux City, Iowa.

Hermann,  
Mo.

San Diego,  
Cal.

Improving harbor at San Diego, California: For maintenance, ten thousand dollars.

Wilmington,  
Cal.  
*Proviso.*  
*Contracts.*

Improving Wilmington Harbor, California: Continuing improvement, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for the completion of said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and fifty thousand dollars, exclusive of the amounts herein and heretofore appropriated.

San Luis  
Obispo, Cal.

Improving harbor at San Luis Obispo, California: Continuing improvement, twenty-five thousand dollars.

Oakland, Cal.

Improving harbor at Oakland, California: Continuing improvement in accordance with project numbered three of the report submitted in House Document Numbered Two hundred and sixty-two, Fifty-sixth Congress, second session, with a view to obtaining a channel three hundred feet wide and twenty-five feet deep from San Francisco Bay to Fallon street, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said improvement, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred and fifty thousand dollars, exclusive of the amounts herein and heretofore appropriated.

*Proviso.*  
*Contracts.*

Sacramento  
and Feather  
rivers, Cal.

Improving Sacramento and Feather rivers, California: The Secretary of War may expend the balance remaining to the credit of the Sacramento and Feather rivers, California, and the Sacramento River below Sacramento, California, for the improvement and maintenance of both of said rivers, including snagging, and for such projects as have been heretofore adopted in the Feather River and in the Sacramento River, both above and below Sacramento, and for the purposes of said improvement and maintenance the Secretary of War may, in his discretion, buy or construct from the amount herein made available another snag boat.

Sacramento,  
San Joaquin,  
and Feather  
rivers, etc.,  
Cal.

The Secretary of War is hereby authorized and directed to appoint a board consisting of three engineers of the United States Army (one of whom shall have had experi-



ence on the Sacramento River and two on the Mississippi River) for the purpose of making a general examination of the Sacramento, San Joaquin, and Feather rivers, California, and their tributaries, and of consulting with any engineers, commissioners, or officers who have been appointed by the State of California to determine a method of controlling the overflow of said rivers and their tributaries, with a view of considering what, if anything, the United States can or should do in conjunction with said State to improve the navigation of said rivers and their tributaries, and the probable cost to the United States of such improvement.

Controlling  
overflow of.

Improving San Joaquin River, California: Continuing improvement and for maintenance, twenty thousand dollars.

San Joaquin  
River, Cal.

Improving Mokelumne River, California: Continuing improvement and for maintenance, two thousand five hundred dollars.

Mokelumne  
River, Cal.

Improving Napa River and Petaluma Creek, California: Continuing improvement and for maintenance, three thousand dollars.

Napa River  
and Petaluma  
Creek, Cal.

Improving Tillamook Bay and bar, Oregon: For maintenance, ten thousand dollars.

Tillamook  
Bay, Oreg.

Improving Coquille River, Oregon: Continuing improvement and for maintenance, fifty-five thousand dollars.

Coquille Riv-  
er, Oreg.

Improving Coos River, Oregon: Such amount as may be necessary for the maintenance of this improvement is hereby diverted from the moneys now available for the improvement of the entrance to Coos Bay and Harbor, Oregon.

Coos River,  
Oreg.

Improving upper Columbia and Snake rivers, Oregon: Washington, and Idaho: Continuing improvement and for maintenance, twenty-five thousand dollars, which may be expended in completing the improvement and for maintenance of the Snake River between Riparia and Lewiston, and between Lewiston and Pittsburg Landing.

Columbia  
and Snake riv-  
ers, Wash. and  
Idaho.

Improving Columbia River at the Cascades, Oregon: Continuing improvement, thirty thousand dollars.

Columbia  
River at the  
Cascades,  
Oreg.

Improving Willamette River above Portland and Yamhill River, Oregon: Continuing improvement and for maintenance, fifty thousand dollars.

Willamette  
River, etc.,  
above Port-  
land.

Improving the lower Willamette and Columbia rivers below Portland, Oregon: Continuing improvement, one hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate one hundred and twenty-five thousand dollars, exclusive of the amounts herein and heretofore appropriated.

Willamette  
and Columbia  
rivers below  
Portland.  
*Provided*.  
Contracts.

Mouth of  
Columbia Riv-  
er, Oreg. and  
Wash.

*Proviso.*  
Contracts.

Improving the mouth of Columbia River, Oregon and Washington: Continuing improvement in accordance with the report submitted by a board of engineers January twenty-fourth, nineteen hundred and three, four hundred thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate three hundred thousand dollars, exclusive of the amounts herein and heretofore appropriated.

The Dalles  
Rapids to Ce-  
lilo Falls,  
Oreg. and  
Wash.

*Proviso.*  
Contracts.

Improving the Columbia River between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington: Continuing improvement by means of canals and locks in accordance with the modified project submitted by the Board of Engineers appointed pursuant to the river and harbor Act of June thirteenth, nineteen hundred and two, fifty thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred and fifty thousand dollars exclusive of the amounts herein and heretofore appropriated.

Grays Har-  
bor, Wash.

Improving Grays Harbor and bar entrance, Washing-  
ton: For maintenance, thirty thousand dollars.

Inner por-  
tion and Che-  
halis River.

Improving Grays Harbor, inner portion, between Aber-  
deen and the entrance to said harbor, and Chehalis River,  
Washington: Continuing improvement, thirty thousand  
dollars.

New What-  
com Harbor,  
Wash.

Improving New Whatcom Harbor, Washington: Con-  
tinuing improvement, thirty-five thousand dollars.

Puget Sound.  
Water route,  
Lakes Union  
and Washing-  
ton, Wash.

*Proviso.*  
Channel.

Improving the waterway connecting Puget Sound with  
Lakes Union and Washington, Washington: Continuing  
improvement, one hundred and twenty-five thousand dol-  
lars: *Provided*, That this appropriation, together with  
the unexpended balance to the credit of said improve-  
ment, shall be expended in securing by dredging a deeper  
and wider low-water channel from Shilshole Bay through  
Salmon Bay to the wharves at Ballard. Nothing herein  
shall be construed as the adoption of any project for the  
construction of the waterway connecting Puget Sound  
with Lakes Union and Washington.

Tacoma Har-  
bor, Wash.

Improving Tacoma Harbor, Washington: For improve-  
ment of the Puyallup waterway by dredging a channel  
five hundred feet in width and three thousand six hun-  
dred and fifty feet in length from its northern end, and to  
a depth of twenty-eight feet at extreme low water, in ac-  
cordance with the report submitted in House Document  
Numbered Five hundred and twenty, Fifty-eighth Con-  
gress, second session, forty thousand dollars: *Provided*,  
That a contract or contracts may be entered into by the

*Provisos.*  
Contracts.

Secretary of War for such materials and work as may be necessary to complete said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred thousand dollars exclusive of the amounts herein appropriated: *Provided further*, That the United States shall be under no expense for the construction of bulkheads, groins, or filling; and before any portion of this appropriation shall be expended, or any contract let for this improvement, suitable provision shall be made, to be approved by the Secretary of War, that in the prosecution and completion of the work of dredging said channel the cost and charges for the construction of necessary bulkheads and groins, or for necessary filling, will be furnished upon the demand of the United States engineer in charge, and the design and location of said bulkheads and groins shall be subject to his supervision; and all necessary filling shall be made in accordance with the plans and specifications furnished by said engineer: *And provided further*, That no expenditure shall be made under this appropriation unless provision satisfactory to the Secretary of War is made for the permanent maintenance of said project, when completed, without expense to the United States.

Channel.

Expenditures.

For gauging waters of Columbia River and measuring tidal and river volumes, one thousand dollars.

Columbia River. Gauging waters.

Improving the Columbia River between the mouth of the Willamette River and the city of Vancouver, Washington: Continuing improvement in accordance with the project approved and recommended by the Board of Engineers for Rivers and Harbors, contained in House Document Numbered Fifty-six, Fifty-eighth Congress, second session, thirty thousand dollars: *Provided*, That a contract or contracts may be entered into by the Secretary of War for such materials and work as may be necessary to prosecute said project, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate thirty thousand dollars, exclusive of the amounts herein and heretofore appropriated: *Provided further*, That such modifications may be made as conditions existing at the time the work is begun indicate to be advisable: *And provided further*, That such modifications shall not cause the total cost of the work to exceed sixty thousand dollars.

Mouth of Willamette to Vancouver, Wash.

Provisos. Contracts.

Modifications.

Maximum cost.

Improving Cowlitz and Lewis rivers, including the North Fork of the Lewis River, Washington: Continuing improvement and for maintenance, ten thousand dollars.

Cowlitz and Lewis rivers, etc., Wash.

Improving Puget Sound and its tributary waters, Washington: Continuing improvement and for maintenance, twenty thousand dollars, of which amount so much as may be necessary may be expended in the removal of Star Rock, Bellingham Bay, and of rock obstructions at the entrance of Roche Harbor.

Puget Sound, etc., Wash.

Swinomish  
Slough, Wash.

Improving Swinomish Slough, Washington: Continuing improvement, five thousand dollars.

Okanogan  
and Pend  
Oreille rivers,  
Wash.

Improving the Okanogan and Pend Oreille rivers, Washington: For maintenance of the Okanogan River and for continuing improvement and maintenance of the Pend Oreille River, fifteen thousand dollars.

Snohomish  
River, Wash.

Snohomish River at Stretch's riffle, Washington: Completing improvement in accordance with the approved project contained in House Document Numbered One hundred and sixty-three, Fifty-eighth Congress, second session, six thousand five hundred dollars.

Snake River,  
Alaska.

Nome Im-  
provement  
Company  
granted right  
to dredge.

There is hereby granted to the Nome Improvement Company, a corporation organized under the laws of the State of Washington, the right to dredge Snake River, which enters Bering Sea at or near Nome, Alaska, for a distance of not exceeding five thousand feet from the mouth thereof, and to extend such channel seaward not beyond a point where the water is twelve feet deep, and to construct jetties on both sides of the channel so dredged, and bulkheads at the outer end thereof, in accordance with plans to be approved by the Secretary of War, with a view to making said Snake River available for harbor purposes for vessels drawing not less than six feet of water, and providing an entrance thereto.

Toll.

Upon the completion of the dredging of said Snake River and the construction of the bulkheads and jetties, so as to form a channel from the ocean into Snake River not less than fifty feet wide and six feet deep at mean low tide, the said Nome Improvement Company shall have the right, during the time it may maintain the channel aforesaid, to collect as toll on freight and passengers entering or leaving the mouth of the jetties so constructed, as follows: On all freight carried in or out, one dollar per ton; passengers, twenty-five cents each; horses and cattle, one dollar per head; hogs and sheep, twenty-five cents each: *Provided, however,* That these rates of toll and any wharfage rates charged or imposed by the said company may be revised, modified, or changed by the Secretary of War whenever he becomes satisfied that the same are unreasonable or oppressive: *Provided further,* That all native Indians and Eskimos shall have the right of free ingress and egress through said channel and jetties to and from Snake River with their boats, provisions, and personal effects.

Schedule.

Provisos.  
Revision, etc.

Indians and  
Eskimos.  
Right of in-  
gress, etc.

Reclaimed  
land.

Provisos.  
Title to tide  
lands.

The said improvement company shall have the right to occupy and use land by it reclaimed on each side of its said jetties and channels constructed by it where such land is not at the time of approval of this act legally held or owned by any person, company, or corporation: *Provided,* That nothing herein contained shall be construed as limiting the rights of any State which may be hereafter organized from said Territory of Alaska to assert title to tide lands: *Provided further,* That the United States may, upon notice to said company of not less than

one year, take possession of and acquire full title to all such harbor or channel improvements constructed and rights in land reclaimed by said Nome Improvement Company under authority hereof, upon payment to said company of the reasonable value thereof, excluding the value of the franchise: *Provided further*, That the work of improvement herein described shall be begun within one year from the date of approval of this Act: *Provided further*, That if after the lapse of two years from date of approval of this Act the said improvement company shall, at any time during the season of navigation, permit any portion of said channel between the jetties, including that portion of the river improved by it, for three consecutive months to be of less depth than six feet at mean low tide, for a full width of fifty feet, then all rights of said company as herein determined shall cease, and the harbor improvements constructed, including bulkheads, jetties, and rights in reclaimed lands, shall become the property of the United States without recompense to the company: *Provided further*, That no exclusive privileges to dredge in Snake River as an incident to mining are herein conferred; and the said improvement company shall assume all liability for damages that may arise as the result of work undertaken by it under the authority of this Act: *Provided further*, That this Act shall not be held to authorize the infringement or impairment of the legal rights of any person, company, or corporation: *And provided further*, That said harbor, when duly constructed, shall, under uniform regulations to be adopted by said company, and approved by the Secretary of War, be free to such vessels as may be able to enter the same as a harbor of refuge in stress of weather.

Right of possession, etc., by United States.

Commencement of improvements.

Failure to maintain channel depth.

Restriction.

Prior rights not affected.

Free to vessels in stress of weather.

Amendment.

Congress reserves the right to alter, amend, or repeal any of the provisions of this Act in so far as it relates to this franchise.

Improving harbor at Honolulu, Hawaii: In accordance with the report and surveys made by the land department of the government of the Sandwich Islands prior to annexation and the further report of Lieutenant Slattery, two hundred thousand dollars: *Provided*, That a contract or contracts may be entered into for such materials and work as may be necessary to prosecute said work, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate two hundred thousand dollars in excess of the amount herein appropriated. The amounts herein appropriated and authorized may be expended upon sections one, two, and three, it being the intention to provide first for the completion of section one, and the Secretary of War is authorized and directed to cause a resurvey of said harbor to be made.

Honolulu, Hawaii.

Proviso. Contracts.

For emergencies: To provide for the restoration of channels, or river and harbor improvements heretofore established or made by the Government, or herein pro-

Emergencies appropriation.



	vided for, where by reason of emergency occurring after the passage of this Act the usual depth of such channels or customary use of such improvement can not be maintained and there is no sufficient fund available for such restoration, three hundred thousand dollars. The amount herein provided shall be allotted by the Secretary of War: <i>Provided</i> , That in no case shall such allotment be made unless recommended by the local engineer having such channel or improvement in charge, and by the Chief of Engineers, respectively: <i>Provided further</i> , That for no single channel or improvement shall a sum greater than ten thousand dollars be allotted.
<i>Provides.</i> Allotments.	
Maximum allotment.	
Tidal water depth.	The depth of water in tidal waters whenever referred to in this Act shall be understood to mean the depth at mean low water unless otherwise expressed.
Use of appropriations.	Appropriations made for the respective works herein named, or so much thereof as may [be] necessary, may, in the discretion of the Secretary of War, be used for maintenance and for the repair and restoration of said works whenever from any cause they have become seriously impaired as well as for the further improvement of said works.
Surveys and examinations.	Surveys and examinations provided for in this section shall, unless otherwise expressed, be paid for from the appropriations made for the respective improvements or projects to which they pertain, or in connection with which they are mentioned.
Contracts, etc.	All works of improvement heretofore or herein authorized to be prosecuted or completed under contracts may, in the discretion of the Secretary of War, be carried on by contract or otherwise, as may be most economical or advantageous to the United States.
Allotments.	Where separate works or items are consolidated in this Act and an aggregate amount is appropriated therefor, the amounts herein appropriated shall be expended in securing maintenance and improvement according to the respective projects herein or heretofore adopted by Congress, after giving due regard to the respective needs of traffic. The allotments to the respective works herein consolidated shall be made by the Secretary of War upon recommendations by the Chief of Engineers. In case such works or items are consolidated and separate amounts are given with each project, the amounts so named shall be expended upon such separate projects, unless in the discretion of the Secretary of War another allotment or division should be made of the same. Any
Use of balances.	balances now remaining to the credit of the consolidated items in this Act shall be carried to the credit of the respective aggregate amounts appropriated for the consolidated items herein contained.
Combining contracts.	In all cases where separate appropriations are made for works in this Act, if money can be more advantageously expended by combining under one contract two

or more such works, such combinations are authorized and shall be made.

SEC. 2. For preliminary examinations and surveys (other than those mentioned in section one), contingencies, expenses connected with inspection of bridges, the service of notice required in such cases, the examination of bridge sites and reports thereon, and for incidental repairs for which there is no special appropriation for rivers and harbors, three hundred and twenty-five thousand dollars: *Provided*, That no preliminary examination, survey, project, or estimate for new works other than those designated in this or some prior Act or resolution shall be made: *Provided further*, That after the regular or formal reports made as required by law on any examination, survey, project, or work under way or proposed, are submitted no supplemental or additional report or estimate shall be made unless ordered by a concurrent resolution of Congress. The Government shall not be deemed to have entered upon any project for the improvement of any waterway or harbor mentioned in this Act until funds for the commencement of the proposed work shall have been actually appropriated by law.

Preliminary  
examinations,  
etc.  
Appropriation.

Provisions.  
New works.

Supplemental  
reports.

SEC. 3. That in all cases in which appropriations or authorizations have heretofore been made, or are herein made, for the completion of river and harbor works, and the amounts appropriated or authorized shall prove insufficient for completion, the Secretary of War may, in his discretion, on the recommendation of the Chief of Engineers, apply such amounts appropriated or authorized for the prosecution of such work.

Insufficient  
appropriations.

SEC. 4. That the Secretary of War is hereby authorized and empowered to prescribe regulations to govern the transportation and dumping into any navigable water, or waters adjacent thereto, of dredgings, earth, garbage, and other refuse materials of every kind or description, whenever in his judgment such regulations are required in the interest of navigation. Such regulations shall be posted in conspicuous and appropriate places for the information of the public; and every person or corporation which shall violate the said regulations, or any of them, shall be deemed guilty of a misdemeanor and shall be subject to the penalties prescribed in section sixteen of the river and harbor Act of March third, eighteen hundred and ninety-nine, for violation of the provisions of section thirteen of the said Act: *Provided*, That any regulations made in pursuance hereof may be enforced as provided in section seventeen of the aforesaid Act of March third, eighteen hundred and ninety-nine, the provisions whereof are hereby made applicable to the said regulations: *Provided further*, That this section shall not apply to any waters within the jurisdictional boundaries of any State which are now or may hereafter be used for the cultivation of oysters under the laws of such State,

Depositing  
refuse in navigable waters.

Regulations.

Vol. 30, p.  
1152.

Provisions.  
Enforcement.  
Vol. 30, p.  
1158.

Exception.



except navigable channels which have been or may hereafter be improved by the United States, or to be designated as navigable channels by competent authority, and in making such improvements of channels, the material dredged shall not be deposited upon any ground in use in accordance with the laws of such State for the cultivation of oysters, except in compliance with said laws:

Expenses of enforcement.

*And provided further,* That any expense necessary in executing this section may be paid from funds available for the improvement of the harbor or waterway, for which regulations may be prescribed, and in case no such funds are available the said expense may be paid from appropriations made by Congress for examinations, surveys, and contingencies of rivers and harbors.

Cane River, Natchitoches Parish, La., not navigable, etc.

SEC. 5. That Cane River, in Natchitoches Parish, Louisiana, is hereby declared to be not a navigable water of the United States within the meaning of the laws enacted by Congress for the preservation and protection of such waters.

Investigations, inspections, etc.  
Payment of expenses.

SEC. 6. That expenses incurred by the Engineer Department in all investigations, inspections, hearings, reports, service of notice, or other action incidental to examination of plans or sites of bridges or other structures built or proposed to be built in or over navigable waters, or to examinations into alleged violations of laws for the protection and preservation of navigable waters, or to the establishment or marking of harbor lines, shall be payable from any funds which may be available for the improvement, maintenance, operation, or care of the waterways or harbors affected, or if such funds are not available in sums judged by the Chief of Engineers to be adequate, then from any funds available for examinations, surveys, and contingencies of rivers and harbors.

Repeal of provisions in former acts.

SEC. 7. That the provisions of river and harbor Acts heretofore passed providing for the prosecution of work upon the following projects are hereby repealed, and any amounts heretofore appropriated for any of the same now remaining unexpended shall be paid into the Treasury of the United States, to wit:

Powow River, Mass.

Powow River, Massachusetts.

Coscob, etc., Conn.

Coscob Harbor and Mianus River, Connecticut.

Wilson, N. Y.

Wilson Harbor, New York.

Oak Orchard, N. Y.

Oak Orchard Harbor, New York.

St. Lawrence River, etc., N. Y.

Saint Lawrence River at the head of Long Sault Island, New York.

Chincoteague Bay, etc., Va.

Inland waterway from Chincoteague Bay, Virginia, to Delaware Bay, at or near Lewes, Delaware.

Ocracoke Inlet, N. C.

Ocracoke Inlet, North Carolina.

St. Francis River, Mo.

Saint Francis River, Missouri.

Alviso, Cal.

Harbor at Alviso, California.

Yaquina Bay, Oreg.

Yaquina Bay, Oregon, except that an amount may be retained sufficient for maintenance for two years.

Mouth of Siuslaw River, Oregon, except that an amount may be retained sufficient for maintenance for two years: *Provided*, That nothing in this section shall be construed as applying to any work or balances covered by contracts made prior to the passage of this Act.

S i u s l a w  
R i v e r . O r e g .  
P r o v i s o .  
P r i o r c o n -  
t r a c t s .

SEC. 8. That the unallotted balance appropriated by the Act of April twenty-eighth, nineteen hundred and four, entitled "An Act providing for the restoration or maintenance of channels or of river and harbor improvements, and for other purposes," is hereby made available to apply upon the cost of improvements enumerated in this Act, and no further expenditures of said unallotted balance shall be made under the provisions of said Act of April twenty-eighth, nineteen hundred and four.

U n a l l o t t e d  
b a l a n c e a v a i l a -  
b l e .  
V o l . 33, p. 451.

SEC. 9. That the Secretary of War is hereby directed to cause preliminary examinations or surveys to be made at the localities named in this section as hereinafter provided. In all cases, unless a survey or estimate is herein expressly directed, a preliminary examination shall first be made which shall embrace information concerning the commercial importance, present and prospective, of the river or harbor mentioned, and a report as to the advisability of its improvement. Whenever such preliminary examination has been made, in case such improvement is not deemed advisable, no surveys thereof or estimate therefor shall be made without the direction of Congress; but in case the report shall be to the effect that such river or harbor is worthy of improvement, or that a survey and estimate should be made to determine the advisability of improvement, the Secretary of War is hereby directed, at his discretion, to cause surveys to be made and the cost of improvement of such river or harbor to be estimated and reported to Congress: *Provided*, That in all cases preliminary examinations as well as surveys shall be examined and reviewed by the board provided for in section three of the river and harbor Act of June thirteenth, nineteen hundred and two. Such examination and review shall be made by the said board of all examinations or surveys provided for in this Act, whether contained in section one or section ten; said board shall also on request by resolution of the Committee on Commerce of the United States Senate, or the Committee on Rivers and Harbors of the House of Representatives, examine and review surveys provided for by Acts or resolutions prior to the river and harbor Act of June thirteenth, nineteen hundred and two, and report thereon: *Provided further*, That at any time prior to the assembling of Congress in December, nineteen hundred and five, all reports of preliminary examinations and surveys that may be ready for printing shall, in the discretion of the Secretary of War, be printed by the Public Printer as documents of the Fifty-ninth Congress.

P r e l i m i n a r y  
e x a m i n a t i o n s ,  
e t c . , a u t h o r -  
i z e d .

P r o v i s o .  
R e v i e w b y  
B o a r d o f E n -  
g i n e e r s f o r  
R i v e r s a n d  
H a r b o r s .  
V o l . 32, p.  
372.

R e p o r t .

P r i n t i n g .

## Alabama.

## ALABAMA.

Alabama River, with a view to securing a continuous navigation of four feet from the mouth to Montgomery, and from Montgomery to Wetumpka.

Conecuh River.

Tombigbee River, from Demopolis, Alabama, to Co-  
Alabama River, with a view to securing a continuous channel four feet deep.

## Arkansas.

## ARKANSAS.

Upper Cache River, from the lower line of Jackson County to the upper line of Green County.

Saint Francis River, with a view to open-channel improvement.

## California.

## CALIFORNIA.

Monterey Harbor.

Humboldt Bay, with a view to enlarging the channel in and from said bay to the city of Eureka.

Petaluma Creek, with a view to straightening and otherwise improving the same.

San Rafael Creek.

## Connecticut.

## CONNECTICUT.

Thames River to Allyns Point.

Bridgeport Harbor, with a view to enlarging and improving the outer harbor.

Norwalk Harbor, with a view to a channel eight feet in depth to the head of navigation; a channel six feet in depth to East Norwalk, and widening the main channel at South Norwalk, so as to afford a turning basin.

New London Harbor, with a view to obtaining a depth of thirty feet in the main entrance channel from deep water to the railroad bridge, and therefrom with a width of four hundred feet to the naval station of such width and with such anchorage space as may be necessary.

Connecticut River between Hartford, Connecticut, and Holyoke, Massachusetts: The Secretary of War is authorized and directed to reconvene the Board of Engineer Officers heretofore designated under provision of the river and harbor Act approved June thirteenth, nineteen hundred and two, and which board reported upon said improvement in a report dated August eleventh, nineteen hundred and four, for the purpose of preparing and submitting an additional report on the improvement of said river by open-channel work or methods other than those already reported upon.

V o l. 32, p.  
348.

## Delaware.

## DELAWARE.

Saint Jones and Little rivers, with a view to connecting the same at or near Dover by a canal or by diverting one of said streams.

**Broadkill Creek.**

**Indian River.**

The artificial channels constructed in connection with the proposed inland waterway from Chincoteague, Virginia, to Delaware Bay, at or near Lewes, Delaware, with a view to ascertaining whether any bridge or bridges should be constructed over such artificial channels.

**FLORIDA.**

**Florida.**

The Saint Johns River, opposite the city of Jacksonville, with a view to obtaining twenty-four feet of water at mean low tide between the channel of said river as it now is and the pierhead lines as established by the Government in front of the city of Jacksonville and in front of South Jacksonville.

Saint George Sound, including Apalachicola and Carabelle harbors, with a view to such extensions of channel depths or modifications of projects as will meet the requirements of commerce.

**Cedar Keys.**

Fernandina Harbor, with a view to such extensions of the depth and width of the channel in front of the town as will meet the requirements of commerce.

**Harbor at Saint Petersburg.**

**Caloosahatchee River.**

**Oklawaha River, from its mouth to Lake Eustis.**

**Withlacoochee River, from Port Inglis to the anchorage in the Gulf, with a view of straightening the channel and making it one hundred feet in width and ten feet in depth.**

**Sebastian Inlet.**

**GEORGIA.**

**Georgia.**

**Brier Creek to Garnett.**

**Oconee River, from Georgia railroad bridge to the northern boundary of Greene County.**

**Oconee River, from Georgia railroad bridge at Milledgeville, to Central of Georgia railway bridge at Oconee station, Washington County.**

**Ocmulgee River, from the city bridge at Fifth street, Macon, to Juliet, Monroe County.**

**Brunswick Harbor, inner and outer.**

**Savannah Harbor, resurvey, with a view to securing a channel depth of twenty-six feet to the sea.**

**IDAHO.**

**Idaho.**

**Clearwater River, with a view to barge navigation.**

**ILLINOIS.**

**Illinois.**

**Ohio River, at and near Metropolis.**

**Mississippi River at Hamburg Bay, with a view to preventing the formation of a bar at the mouth of said bay.**

West Fork of the South Branch of the Chicago River, with a view to securing a twenty-one foot channel.

Indiana.

INDIANA.

Indiana Harbor, with a view to ascertaining what improvements are required in the channels affording access to said harbor and for the protection of such channels and harbor.

Kentucky.

KENTUCKY.

Green River, from Lock Numbered Six to Munfordville.

Louisiana.

LOUISIANA.

Mermentau River, from its headwaters at the junction of Bayous des Cannes and Nez Pique (including those portions of Lake Arthur, Grand Lake, and White Lake lying directly across its course) to a point in the Gulf of Mexico beyond the bar at its mouth, with a view of securing a permanent channel to a depth of at least twenty feet.

Calcasieu Lake and River, from the mouth of Calcasieu Pass to the head of navigation in Calcasieu River.

Louisiana  
and Texas.

LOUISIANA AND TEXAS.

Inland waterway from the Rio Grande River, Texas, to a connection with the Mississippi River at Donaldsonville, Louisiana, said examination to be made in sections, as follows:

First. From the Rio Grande River to Aransas Pass, including a navigable channel from Corpus Christi through Turtle Cove to Aransas Pass.

Second. From Aransas Pass to West Galveston Bay Channel at the Brazos River, including a channel from Aransas Pass to Victoria on the Guadalupe River, and to Cuero.

Third. From the Brazos River to Sabine Pass.

Fourth. From Sabine Pass to Donaldsonville.

A survey and estimate shall be made of the following portions of the above waterway, to wit: From Aransas Pass, via Turtle Cove, to Corpus Christi; and from Aransas Pass to and up the Guadalupe River to Victoria, and from Victoria to Cuero.

Maine.

MAINE.

Cape Porpoise Harbor, with a view to the removal of obstructions at the entrance.

Portland Harbor, with a view to including Fore River above Portland Bridge and the entrance to Back Cove.

Long Cove, with a view to the removal of two ledges.

North Haven.

Hendricks Harbor, with a view to rock removal.

Kennebec River, from the mouth to Gardiner.

Penobscot River at Bangor.

South branch of the Penobscot River at and near Frankfort.

Center Harbor, Brooklin, with a view to the construction of a breakwater and removal of ledge.

MARYLAND.

Maryland.

Crisfield Harbor.

Elk River.

Wicomico River [\*], from its mouth to Salisbury.

Kent Narrows.

Tyaskin [Wetipquin] Creek at and near Tyaskin.

MASSACHUSETTS.

Massachusetts.

Beverly Harbor.

Kingston Harbor.

Mystic River to the upper limits of the city of Somerville.

New Bedford and Fair Haven harbors, with a view to obtaining additional anchorage grounds and increased depth.

Winthrop Head and Allerton Point, with a view to the necessity of constructing a sea wall to protect navigation.

Dorchester Bay and Neponset River.

Saugus River.

Essex River.

Ipswich River.

MICHIGAN.

Michigan.

Manistee Harbor, with a view to obtaining a uniform depth of eighteen feet.

Rogers City, with a view to construction of a harbor of refuge.

Lake Harbor, with a view to obtaining a harbor of ten feet.

River Rouge.

Caseville.

Pentwater Harbor, with a view to obtaining a depth of sixteen feet.

South shore of Lake Superior, in the vicinity of Keweenaw Point, with a view to determining whether a harbor of refuge should be established in that locality.

Ship channel connecting waters of the Great Lakes between Chicago, Duluth, and Buffalo, with a view to obtaining depths of twenty-two and twenty-five feet, respectively, and sufficient width.

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\* On the eastern shore.

Minnesota  
and Wisconsin.

MINNESOTA AND WISCONSIN.

Saint Croix River.

Minnesota.

MINNESOTA.

Rainy River.

Big and Little Fork rivers.

Survey of Lake Minnetonka, for the purpose of charting only.

Minnesota  
and North Dakota.

MINNESOTA AND NORTH DAKOTA.

Red River of the North, from Fargo to the international boundary line.

Mississippi.

MISSISSIPPI.

Big Sunflower River, with a view to obtaining continuous navigation from its mouth to the railroad bridge at Clarksdale.

Pearl River, from the mouth to Rockport.

Pearl River, from Edinburg to Lake Burnside.

Wolf and Jordan rivers, with a view to the removal of bars at the mouths thereof.

Tallahatchie River, from the mouth of Coldwater River to Batesville.

Anchorage basin at Gulfport, and channel therefrom to the anchorage or roadstead at Ship Island, with a view to obtaining a sufficient depth and width. Also Ship Island Pass, between Ship and Cat islands.

Missouri.

MISSOURI.

Harbor and approaches to Saint Louis, with a view to preventing floods by reason of obstructions in the Mississippi River.

New Jersey.

NEW JERSEY.

Arthur Kill, on westerly side, from a point opposite the north end of Pralls Island to about two thousand feet north of Piles Creek, and Piles Creek up to Long Branch Railroad.

Cold Spring Inlet, Cape May, with a view to securing a channel from the inside harbor to deep water and the creation of a harbor of refuge.

A channel from the Kill von Kull north of Shooters Island to the existing channel near to Corner Stake Light, including the reef at Bergen Point Light, with a view to obtaining a depth of sixteen feet.

Newark Bay and Passaic River from Staten Island Sound to the Montclair and Greenwood Lake Railroad bridge, with a view to providing increased depth and width.

Old South River.



Periwig Bar in the Delaware River, between Trenton and Bordentown.

Atlantic Highlands, with a view to the location of a breakwater.

Maurice River.

Cohansey River.

NEW YORK.

New York.

Bay Ridge Channel, with a view to the construction of a breakwater opposite the wharves.

Lloyds Harbor, with a view to improving the channel between Huntington Bay and Cold Spring Harbor.

Buffalo Breakwater, with a view to ascertaining what modifications, if any, are required.

Clayton Harbor.

Hudson River, with a view to extending the existing project to Waterford.

Saint Lawrence River at or near the Thousand Islands Park.

New York Bay from Kill von Kull to a point in the vicinity of Liberty Island west of Robbins Reef Light-House, with a view to a twenty-one foot channel of sufficient width.

Mouth of Black River.

Wappinger Creek, with a view to rock removal.

Hay Harbor, Fishers Island.

Morristown Harbor.

Dexters Harbor.

Fire Island Inlet, with a view to the construction of a breakwater.

NORTH CAROLINA.

North Carolina.

Inland waterway from Norfolk, Virginia, to Beaufort Inlet, North Carolina, with a view to obtaining a channel of a depth of ten and twelve feet, respectively, upon the most advantageous route between the points named. Such examination and survey shall be made by a board of engineer officers detailed by the Secretary of War, and they shall report upon the character and probable cost of any private waterways which it may be desirable to acquire in connection with, or as a part of the proposed improvement.

Pamlico and Tar rivers, with a view to obtaining a depth of ten feet below Washington, and four feet above as far as Greenville, with suitable widths.

Bennetts River at and above Gatesville.

Meherrin River, from the mouth thereof to the town of Murfreesboro.

Northeast River.

Shallotte River, from its mouth to the town of Shallotte.

Oregon.

OREGON.

Astoria Harbor.

Clatskanie River, with a view to straightening the channel between Beaver Slough and Wallace Slough.

Ohio.

OHIO.

Ashtabula Harbor, with a view to the extension of the easterly arm of the breakwater.

Cleveland Harbor, with a view to obtaining wharf room for the storage of material and plant and other Government property.

Pennsylvania.

PENNSYLVANIA.

Delaware River, shoal opposite Greenwich coal piers, with a view to its removal.

Rhode Island.

RHODE ISLAND.

Pawtuxet Cove.

Newport Harbor, with a view to extending the space for light-draft anchorage in the southern part thereof.

Pawtucket River, with a view to deepening the channel to eighteen feet.

Tennessee.

TENNESSEE.

Mississippi River, from the town of Ashport, Tennessee, to the highlands above overflow at or near the town of Fort Pillow, and from Ashport east to the highlands above overflow in Lauderdale County, with a view to improving navigation of said section of the river and preventing overflow.

Big Sandy River from mouth to Big Sandy.

Texas.

TEXAS.

Galveston Channel, with a view to enlargement and extension farther west, and the Secretary of War is authorized and directed to ascertain the rights of the United States in land bordering upon said channel, or to be created by excavations therefrom, and to make such recommendations with respect thereto as he may deem desirable.

Galveston Harbor, with a view of obtaining a uniform depth of thirty feet.

Sulphur River.

Port Bolivar, with a view to obtaining a channel three hundred feet wide, of depths of twenty-five and thirty feet, respectively, to deep water.

Matagorda Bay, with a view to obtaining a channel to Matagorda.

## VIRGINIA.

Virginia.

Coan River, upper portion.

Warwick Creek.

Norfolk Harbor, including the eastern and southern branches thereof, and from the Norfolk channel of the Elizabeth River to the drawbridge across the Western Branch.

Upper Machodoc Creek.

Occoquan Creek.

Quantico Creek.

Blackwater Creek.

Channel from deep water in Hampton Roads to the Norfolk Navy-Yard, with a view to widening and straightening the same, and to submit estimates for increasing the depth thereof to twenty-five feet and thirty feet, respectively.

## WASHINGTON.

Washington.

Olympia Harbor.

Everett Harbor, with a view to the extension of the dike and of the dredged area.

Ilwaco Harbor, with a view to deepening the channel near the harbor and near to Sand Island to a depth of eight feet.

Duwamish River.

Willapa River from South Bend to Raymond, with a view to obtaining depths of twelve and eighteen feet, respectively.

Grays Harbor, inner portion, and Chehalis River to Montesano.

Harbor at Anacortes.

General survey or examination of Columbia River and tributaries above Celilo Falls including that portion between Wenatchee and Kettle Falls, with a view to open channel work.

## WEST VIRGINIA.

West Virginia.

Mouth of Deckers Creek at its confluence with the Monongahela River, with a view to securing for a distance of one thousand six hundred feet a channel with the same depth of water as in said Monongahela River, and restoring and improving the harbor destroyed by flood.

## WISCONSIN.

Wisconsin.

Oconto Harbor, with a view to the modification of the present plan and the construction of a harbor near the mouth of the river with depths of sixteen and eighteen feet, respectively.

Survey of Lake Winnebago, for the purpose of charting only.

Alaska.

TERRITORY OF ALASKA.

Saint Michael Canal, with a view to straightening and otherwise improving the same.

Porto Rico.

TERRITORY OF PORTO RICO.

Harbor of San Juan, with a view of obtaining sufficient anchorage grounds, and depths, respectively, of twenty-four and thirty feet in the channels reaching thereto.

Harbor at Ponce.

Harbor at Mayaguez.

Great Harbor, Culebra Island, with a view to providing a sufficient entrance or entrances thereto.

Hawaii.

TERRITORY OF HAWAII.

Harbor at Hilo, Island of Hawaii, with a view to the construction of a breakwater along Blonde Reef to Coconut Island.

Midway Islands.

MIDWAY ISLANDS.

Welles Harbor, Midway Islands.

Approved, March 3, 1905.

Mar. 3, 1905.  
Vol. 33, p.  
1158.

[H. R. 18989.]  
[Public, No.  
216.]

Sundry civil  
expenses a p-  
propriations.

CHAP. 1483.—An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and six, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and the same are hereby, appropriated, for the objects hereinafter expressed, for the fiscal year ending June thirtieth, nineteen hundred and six, namely:

\* \* \* \* \*

Smithsonian  
Institution.

UNDER SMITHSONIAN INSTITUTION.

\* \* \* \* \*

Government  
building.  
Tender of, to  
District of Co-  
lumbia for pub-  
lic purposes.

The Commissioners of the District of Columbia are hereby tendered, for the use hereinafter specified, the structural steel and other essential portions of the building lately occupied by the United States Government exhibit at the Louisiana Purchase Exposition at Saint Louis, and if said tender is accepted within ninety days from the date of the approval of this Act and the Secretary of the Treasury is notified thereof, then all right, title, and interest in said material is hereby vested in said Commissioners of the District of Columbia to be by them used directly or indirectly through any corporate organization that may be created for the purpose of constructing a public building of such size and strength as will

permit the use of said material substantially in the form in which it was used at the Louisiana Purchase Exposition; said tender to be made upon the further condition that the tearing down of said Government building and the transportation of the material to Washington, District of Columbia, shall involve no expense to the United States. If said tender is accepted as aforesaid permission is hereby granted to store said material on some unimproved public reservation in the city of Washington, District of Columbia, to be selected by the officer in charge of public buildings and grounds with the approval of the Secretary of War.

No expense  
to United  
States.

Storage of  
material.

UNDER THE WAR DEPARTMENT.

War Depart-  
ment.

BUILDINGS AND GROUNDS IN AND AROUND WASHINGTON.

Buildings  
and grounds,  
District of Co-  
lumbia.  
Improvement  
and care.

For improvement and care of public grounds, District of Columbia, as follows:

For improvement and maintenance of grounds south of Executive Mansion, four thousand dollars.

For ordinary care of greenhouses and nursery, two thousand dollars.

For ordinary care of Lafayette Park, two thousand dollars.

For ordinary care of Franklin Park, one thousand dollars.

For improvement and ordinary care of Lincoln Park, two thousand dollars.

For care and improvement of Monument grounds and annex (Potomac Park) to Monument grounds, seven thousand dollars.

Monument  
grounds.

For improvement, care, and preservation of reservation numbered seventeen, and site of old canal northwest of same, two thousand five hundred dollars: *Provided*, That no part thereof shall be expended upon other than property belonging to the United States.

Old canal.

*Proviso.*  
Expenditure.

For construction and repair of post-and-chain fences, repair of high iron fences, constructing stone coping about reservations, painting watchmen's lodges, iron fences, vases, lamps, and lamp-posts; manure, and hauling the same, removing snow and ice; purchase and repair of seats and tools; trees, tree and plant stakes, labels, lime, whitewashing, and stock for nursery, flower pots, twine, baskets, wire, splints, moss, and lycopodium, to be purchased by contract or otherwise, as the Secretary of War may determine; care, construction, and repair of fountains; abating nuisances, cleaning statues, and repairing pedestals, sixteen thousand and fifty dollars.

For improvement, care, and maintenance of various reservations, including purchase, maintenance, and driv-

ing of horse and vehicle for official use of the officer in charge of public buildings and grounds, and of other necessary horses and vehicles for official use, twenty-five thousand dollars.

For improvement, care, and maintenance of Smithsonian grounds, two thousand five hundred dollars.

For improvement, care, and maintenance of Judiciary Park, two thousand five hundred dollars.

For laying asphalt and other walks in various reservations, two thousand dollars.

For broken-stone road covering for parks, two thousand dollars.

For curbing, coping, and flagging for park roads and walks, two thousand dollars.

Potomac  
Park.

For utilizing for the purpose of a nursery the unimproved portion of Potomac Park between the causeway of the Pennsylvania Railroad bridge, the tidal reservoir, and the Potomac River, and for the general improvement of the grounds, in accordance with plans prepared in the office of public buildings and grounds, to be expended under the direction of the officer in charge of that office, sixty-five thousand dollars.

Half from  
District reve-  
nues.

One half of the foregoing sums under "Buildings and grounds in and around Washington" shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Limit for  
concrete, etc.,  
pavements.

Under appropriations herein contained no contract shall be made for making or repairing concrete or asphalt pavements in Washington City at a higher price than one dollar and sixty-five cents per square yard for a quality equal to the best laid in the District of Columbia prior to July first, eighteen hundred and eighty-six, and with a base of not less than six inches in thickness.

Miscellaneous.

For sewerage and draining the propagating gardens, two thousand five hundred dollars.

For this amount to make salary of the chief clerk of the office of public buildings and grounds two thousand four hundred dollars per annum; as heretofore provided, four hundred dollars.

For improvement, care, and maintenance of grounds of Executive Departments, one thousand dollars.

For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Library of Congress as may be requested by the superintendent of the Library building, one thousand dollars.

For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Capitol as may be requested by the superintendent of the Capitol building, three thousand dollars.

For improvement and maintenance of Executive Mansion grounds (within iron fence), four thousand dollars.

For the employment of an engineer by the officer in charge of public buildings and grounds, two thousand four hundred dollars.

For purchase and repair of machinery and tools for shops at nursery, and for the repair of shops and storehouse, one thousand dollars.

EXECUTIVE MANSION: For care, repair, and refurnishing of Executive Mansion, and for purchase, maintenance, and driving of horses and vehicles for official purposes, thirty-five thousand dollars, to be expended by contract or otherwise, as the President may determine.

Executive Mansion.  
Repairs.

For fuel for the Executive Mansion, greenhouses, and stable, six thousand dollars.

For care and maintenance of conservatory and greenhouses, nine thousand dollars.

For repairs to and reerection of greenhouses, Executive Mansion, three thousand dollars.

LIGHTING THE EXECUTIVE MANSION AND PUBLIC GROUNDS: For gas, pay of lamplighters, gas fitters, and laborers; purchase, erection, and repair of lamps and lamp-posts; purchase of matches, and repairs of all kinds; stoves, fuel, and lights for office and office stable, watchmen's lodges, and for the greenhouses at the nursery, twenty thousand dollars: *Provided*, That for each

Lighting Executive Mansion and grounds.

five-foot burner not connected with a meter in the lamps on the public grounds not more than twenty dollars shall be paid per lamp for gas, including lighting, cleaning, and keeping the lamps in repair, under any expenditure provided for in this Act; and said lamps shall burn every night, on the average, from fifteen minutes after sunset to forty-five minutes before sunrise; and authority is hereby given to substitute other illuminating material for the same or less price, and to use so much of the sum hereby appropriated as may be necessary for that purpose: *Provided further*, That four thousand two

Provisions.  
Maximum per lamp.

hundred dollars of the foregoing sum shall be paid from the revenues of the District of Columbia and the remainder from the Treasury of the United States: *And provided further*, That not more than six thousand dollars of said appropriation may be expended for lighting, extinguishing, cleaning, repairing, and painting park lamps of a higher candlepower than those provided for above and not less than sixty candlepower, which lamps shall cost not to exceed twenty-five dollars per lamp per annum and shall otherwise be subject to the restrictions of this paragraph.

Part from District revenues.

Higher candlepower lamps.

For lighting six arc electric lights in Executive Mansion grounds within the iron fence, at not exceeding eighty-five dollars per light per annum, which shall cover the entire cost to the United States of lighting and maintaining in good order each electric light in said grounds, five hundred and ten dollars.

Electric lights.

For lighting six arc electric lights at the propagating gardens, at not exceeding eighty-five dollars per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said arc electric lights, five hundred and ten dollars.



For lighting arc electric lights in public grounds as follows: For seven in grounds south of the Executive Mansion, thirty-two in Lafayette, Franklin, Judiciary, and Lincoln parks, and fourteen in grounds south of Executive Mansion and in Monument Park, at not exceeding eighty-five dollars per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said arc electric lights; in all, four thousand five hundred and five dollars, one half of which sum shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Repair of water pipes.

**REPAIR OF WATER PIPES:** For repairing and extending water pipes, purchase of apparatus for cleaning them, purchase of hose, and for cleaning the springs and repairing and renewing the pipes of the same that supply the Capitol, the Executive Mansion, and the building for the State, War, and Navy Departments, two thousand five hundred dollars.

Government telegraph.

**TELEGRAPH TO CONNECT THE CAPITOL WITH THE DEPARTMENTS AND GOVERNMENT PRINTING OFFICE:** For care and repair of existing lines, one thousand five hundred dollars.

Removing cable lines, etc.

For removing cables of lines from the roof of the Treasury Department building and placing them under ground, one thousand two hundred dollars; and authority is hereby granted for laying the necessary conduits under the streets, avenues, and sidewalks of the city for that purpose.

Washington Monument.

**WASHINGTON MONUMENT:** For the care and maintenance of the Washington Monument, namely: For one custodian, at one hundred dollars per month; one steam engineer, at eighty dollars per month; one assistant steam engineer, at sixty dollars per month; one fireman, at fifty dollars per month; one assistant fireman, at forty-five dollars per month; one conductor of elevator car, at seventy-five dollars per month; one attendant on floor, at sixty dollars per month; one attendant on top floor, at sixty dollars per month; three night and day watchmen, at sixty dollars per month each; in all, eight thousand five hundred and twenty dollars.

Expenses.

For fuel, lights, oil, waste, packing, tools, matches, paints, brushes, brooms, lanterns, rope, nails, screws, lead, electric lights, heating apparatus, oil stoves for elevator car and upper and lower floors, repairs to engines, boilers, dynamos, elevator, and repairs of all kinds connected with the Monument and machinery, and purchase of all necessary articles for keeping the Monument, machinery, elevator, and electric plant in good order, three thousand dollars.

Repairs to house where Lincoln died.

**REPAIRS OF BUILDING WHERE ABRAHAM LINCOLN DIED:** For painting and miscellaneous repairs, four hundred dollars.

## ENGINEER DEPARTMENT.

Engineer Department.

Toward the construction of works on harbors and rivers, under contract and otherwise, and within the limits authorized by law, namely:

Rivers and harbors.

Improving harbor at Charleston, South Carolina: For continuing improvement in completion of contract authorization, twenty-five thousand dollars.

Charleston, S. C.

For works authorized by the river and harbor Act of eighteen hundred and ninety-six, as follows:

Vol. 29, p. 202.

Improving Portland Harbor, Maine: Continuing improvement, one hundred thousand dollars, and the Secretary of War is hereby authorized to modify the project for improvement adopted by the Act of June third, eighteen hundred and ninety-six, so as to continue the depth of thirty feet at mean low tide for the width of about three hundred feet up Fore River as far as the Boston and Maine Railroad bridge, and to secure a channel of entrance to Back Cove of the same depth and width: *Provided*, That the total cost of work heretofore and herein authorized to be done shall not exceed the limit of cost fixed by the Act of June third, eighteen hundred and ninety-six.

Portland, Me. Back Cove.

Vol. 29, p. 202.

Proviso. Maximum cost.

Improving harbor at Buffalo, New York: For continuing improvement, one hundred and forty-three thousand five hundred and six dollars.

Buffalo, N. Y.

Improving harbor at Cleveland, Ohio: For continuing improvement, one hundred and eighty thousand eight hundred dollars.

Cleveland, Ohio.

Improving Cumberland Sound, Georgia and Florida: For continuing improvement in completion of contract authorization, forty thousand dollars.

Cumberland Sound, Ga. and Fla.

Improving harbor at San Pedro, California: For continuing construction of breakwater, four hundred and sixty thousand dollars.

San Pedro, Cal.

Improving Winyah Bay, South Carolina: For continuing improvement of harbor at Winyah Bay, seventy-five thousand dollars.

Winyah Bay, S. C.

For works authorized by the river and harbor Act of eighteen hundred and ninety-nine, as follows:

Vol. 30, p. 1121.

Improving channel in Gowanus Bay, New York: For continuing improvement of Bay Ridge and Red Hook channels, two hundred thousand dollars.

Gowanus Bay, N. Y.

Improving harbor at Black River, Ohio: For continuing improvement, in completion of contract authorization, of harbor at mouth of Black River, Lorain, Ohio, twenty thousand dollars.

Black River (Lorain), Ohio.

Improving harbor at New York, New York: For continuing improvement of Ambrose Channel (formerly known as East Channel) across Sandy Hook Bar, seven hundred and fifteen thousand five hundred and ten dollars.

Ambrose channel, N. Y.

Improving Ohio River below Pittsburg, Pennsylvania: For continuing improvement in completion of contract

Ohio River below Pittsburg, Pa.

authorization by the construction of Dams Numbered Thirteen and Eighteen, one hundred thousand dollars.

Toledo, Ohio. Improving harbor at Toledo, Ohio: For continuing improvement, one hundred and sixty-one thousand dollars.

Vol. 32, p. 331. For works authorized by the river and harbor Act of nineteen hundred and two, as follows:

Boston, Mass. Improving harbor at Boston, Massachusetts: For continuing improvement by providing channels thirty-five feet deep, and of authorized widths, from the navy-yard at Charlestown and the Chelsea and Charles River bridges to President Roads, and thence by route designated as numbered three through Broad Sound to the ocean, nine hundred and seventy thousand dollars.

Gloucester, Mass. Improving harbor at Gloucester, Massachusetts: For continuing improvement in accordance with the approved and modified project, fifty thousand dollars.

Lake Erie entrance, Black Rock Harbor, N. Y. Improving Lake Erie entrance to Black Rock Harbor and Erie Basin, New York: For continuing improvement, fifty-two thousand dollars.

Arthur Kill, N. Y. and N. J., etc. Improving Arthur Kill, New York and New Jersey: For continuing improvement of channel from Kill von Kull to Raritan Bay, seventy thousand dollars.

Savannah, Ga. Improving harbor at Savannah, Georgia: For continuing improvement in completion of contract authorization, one hundred and seventy-five thousand dollars.

Cleveland, Ohio. Improving harbor at Cleveland, Ohio: For continuing improvement in accordance with the plan for new harbor entrance and breakwater extension, four hundred and fifty thousand dollars.

Passaic River, N. J. Improving Passaic River, New Jersey: For continuing improvement from the Montclair and Greenwood Lake Railroad bridge to deep water in Staten Island Sound, seventy-five thousand dollars.

Great Pedee River, S. C. Improving Great Pedee River, South Carolina: For continuing improvement of upper portion of river, fifteen thousand dollars.

St. Johns River, Fla. Improving of Saint Johns River, Florida: For continuing improvement from Jacksonville to the ocean in completion of contract authorization, two hundred and five thousand dollars.

Black Warrior, Warrior, and Tombigbee rivers, Ala. Improving Black Warrior, Warrior, and Tombigbee rivers, Alabama: For continuing improvement, in completion of contract authorization, by the construction of locks and dams, numbered one, two, and three in the Tombigbee and Warrior rivers, fifteen thousand dollars.

Mississippi River. Southwest Pass. Improving Southwest Pass, Mississippi River: For continuing improvement in accordance with the approved or modified project as authorized, one million two hundred and fifty thousand dollars.

From the mouth of the Ohio to the Missouri. Improving Mississippi River from mouth of Ohio River to Minneapolis, Minnesota: For continuing improvement, in completion of contract authorization, from

the mouth of the Ohio River to the mouth of the Missouri River, six hundred and fifty thousand dollars. And the Secretary of War is authorized to examine the materials furnished and the work and labor done since November first, nineteen hundred, to May twenty-second, nineteen hundred and one, in accordance with the method and system and under the plans of the United States engineer officers in charge to prevent the erosion of the banks at or near Sawyers Bend, in the harbor of Saint Louis, so as to improve the channel and preserve the protection works at said point, and to ascertain the reasonable value of such materials, work, and labor so furnished and done, and to pay out of said sum herein authorized for so much of the same as was in the interest of navigation; not, however, to exceed the sum of fifteen thousand six hundred and seventy-nine dollars and eighty-four cents.

For continuing improvement, in completion of contract authorization, from the mouth of the Missouri River to Saint Paul, Minnesota, four hundred thousand dollars. Missouri River to St. Paul, Minn.

Improving Ouachita River, Arkansas and Louisiana: For continuing improvement of Ouachita and Black rivers, Arkansas and Louisiana, in completion of contract authorization, by the construction of lock numbered four, near Monroe, Louisiana, and of lock numbered six, near Roland Raft, Arkansas, twelve thousand dollars. Ouachita and Black rivers, Ark. and La.

Improving Tennessee River below Chattanooga, Tennessee, Alabama, and Kentucky: For continuing improvement at Colbert and Bee Tree shoals by the construction of a lateral canal, in completion of contract authorization, fifty thousand dollars. Tennessee River.

Improving Ohio River below Pittsburg, Pennsylvania: For continuing improvement by the construction of lock and dam numbered thirty-seven, fifty thousand dollars. Ohio River. Dam No. 37.

Improving Big Sandy River, West Virginia and Kentucky: For continuing improvement in completion of contract authorization by the construction of locks and dams on Big Sandy River and Tug and Levisa forks of the same, eighty-five thousand dollars. Big Sandy River, W. Va. and Ky.

Improving Detroit River, Michigan: For continuing improvement from Detroit to Lake Erie, in accordance with "Plan A," five hundred thousand dollars. Detroit River, Mich.

Improving Middle and West Neebish Channels, Saint Marys River, Michigan: For continuing improvement, one million two hundred thousand dollars. St. Marys River, Mich.

Improving Stockton and Mormon channels, California: For continuing improvement by dredging and by the construction of a canal to divert the waters of Mormon Channel into Calaveras River at and near the city of Stockton, forty-nine thousand three hundred and sixteen dollars. Mormon channel, Cal.

Mississippi  
River Com-  
mission.  
From Head  
of Passes to  
the Ohio.

## UNDER THE MISSISSIPPI RIVER COMMISSION.

**Improving Mississippi River:** For continuing improvement in completion of contract authorization of Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission, two million dollars.

\* \* \* \* \*

Miscellaneous.

## MISCELLANEOUS OBJECTS, WAR DEPARTMENT.

\* \* \* \* \*

Governors Is-  
land, N. Y.

**ENLARGEMENT OF GOVERNORS ISLAND, NEW YORK:** For continuing plan of improvement for the enlargement of Governors Island, New York Harbor, by wharf work, dredging, bulkhead, and filling, one hundred thousand dollars<sup>[a]</sup>.

Sandy Hook,  
N. J.

**SANDY HOOK, NEW JERSEY:** For the construction of a sea wall for the protection of the northern beach of the United States lands at Sandy Hook, New Jersey, forty thousand dollars.

\* \* \* \* \*

Yellowstone  
Park.

**IMPROVEMENT OF THE YELLOWSTONE NATIONAL PARK:** For completing the improvement of the Yellowstone National Park, in accordance with the approved project, eighty-three thousand dollars; for maintenance and repair of existing improvements, fifty thousand dollars; in all, one hundred and thirty-three thousand dollars, to be expended under the direction of the Secretary of War; to be immediately available and to remain available until expended: *Provided*, That of this amount thirty thousand dollars, or so much thereof as may be necessary, may, in the discretion of the Secretary of War, be expended in the Yellowstone Forest Reserve east and south of the park.

\* \* \* \* \*

Maps.

**MAPS, WAR DEPARTMENT:** For publication of maps for use of the War Department, inclusive of war maps, three thousand dollars.

Survey of  
Northern and  
Northwestern  
Lakes.

**SURVEY OF NORTHERN AND NORTHWESTERN LAKES:** For survey of northern and northwestern lakes, including all necessary expenses for preparing, correcting, extending, printing and issuing charts and bulletins, and of investigating lake levels, with a view to their regulation, to be immediately available and to remain available until expended, one hundred thousand dollars.

Transporta-  
tion of reports.

**TRANSPORTATION OF REPORTS AND MAPS TO FOREIGN COUNTRIES:** For the transportation of reports and maps to foreign countries through the Smithsonian Institution, one hundred dollars.

\* \* \* \* \*

<sup>a</sup> All of this appropriation is for work assigned to the Engineer Department.

**CALIFORNIA DÉBRIS COMMISSION:** For defraying the expenses of the Commission in carrying on the work authorized by the Act of Congress approved March first, eighteen hundred and ninety-three, fifteen thousand dollars. California Débris Com-mission. Vol. 27, p. 507.

**HARBOR OF NEW YORK:** For prevention of obstructive and injurious deposits within the harbor and adjacent waters of New York City: New York Harbor. Deposits.

For pay of inspectors, deputy inspectors, office force, and expenses of office, ten thousand two hundred and sixty dollars; Inspectors, etc.

For pay of crews and maintenance of six steam tugs and one launch, sixty-five thousand dollars; Crews, tugs, etc.

For general repairs and overhauling steam tugs, ten thousand dollars; Repairs.

In all, eighty-five thousand two hundred and sixty dollars.

\* \* \* \* \*

## PUBLIC PRINTING AND BINDING.

P u b l i c  
printing and  
binding.

\* \* \* *Provided further,* That hereafter no part of the appropriations made for printing and binding shall be used for any illustration, engraving, or photograph in any document or report ordered printed by Congress unless the order to print expressly authorizes the same, nor in any document or report of any executive department or other Government establishment until the head of the executive department or Government establishment shall certify in a letter transmitting such report that the illustration is necessary and relates entirely to the transaction of public business. R e s t r i c t i o n  
on illustrations, etc.

\* \* \* \* \*

**SEC. 2.** That all sums appropriated by this Act for salaries of officers and employees of the Government shall be in full for such salaries for the fiscal year nineteen hundred and six, and all laws or parts of laws in conflict with the provisions of this Act be, and the same are hereby, repealed. S u m s f o r  
salaries to be  
in full. Repeal.

Approved. March 3, 1905.

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**CHAP. 1484.**—An Act Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, nineteen hundred and five, and for prior years, and for other purposes. Mar. 3, 1905.  
Vol. 33, p.  
1214.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in the [H. R. 19150.]  
[Public, No.  
217.]  
Deficiencies  
appropriations.

appropriations for the fiscal year nineteen hundred and five, and for prior years, and for other objects hereinafter stated, namely:

War Department.

### WAR DEPARTMENT.

Advertisements.  
Road into  
Mount Rainier  
National Park,  
etc.

To enable the Secretary of War to pay the amounts due certain newspapers for publishing advertisements for proposals for construction work and military supplies and set forth on pages eighteen and nineteen of House Document Numbered Two hundred and eighty-seven of this session, one hundred and eighty-six dollars and seventy-two cents.

Charles Keller.  
Credit in accounts.

CREDIT IN THE ACCOUNTS OF CAPTAIN CHARLES KELLER: That the accounting officers of the Treasury be, and they are hereby, directed to credit in the accounts of Captain Charles Keller, Corps of Engineers, the sum of thirteen dollars and sixty-three cents now standing against him on the books of the Treasury.

John Stephen Sewell.  
Credit in accounts.

CREDIT IN THE ACCOUNTS OF CAPTAIN JOHN STEPHEN SEWELL: The accounting officers of the Treasury are authorized and hereby directed to allow and credit on the books of the Treasury the sum of two hundred and thirty-eight dollars and fifty cents in settlement of the accounts of Captain John Stephen Sewell, Corps of Engineers.

Military establishment.

### MILITARY ESTABLISHMENT.

Engineer Department.

### ENGINEER DEPARTMENT.

Alaska.  
Wagon road.

SURVEY FOR WAGON ROAD FROM VALDEZ TO FORT EGBERT, ALASKA: For a survey and estimate of cost of a wagon road from Valdez to Fort Egbert, on the Yukon River, to be made under the direction of the Secretary of War, five thousand seven hundred dollars and sixty-three cents.

Military trail.

SURVEY FOR MILITARY TRAIL BETWEEN YUKON RIVER AND COLDFOOT, ALASKA: For surveying and locating a military trail under the direction of the Secretary of War, by the shortest and most practicable route, between the Yukon River and Coldfoot, on the Koyukuk River, to be immediately available, one thousand four hundred and thirty-one dollars and fifteen cents.

Buildings and grounds, D. C.

### BUILDINGS AND GROUNDS IN AND AROUND WASHINGTON.

Repairs.

To reimburse the appropriation for reconstruction and repair of post-and-chain fences, and other purposes, on



account of increased expenses for removing snow and ice, two thousand dollars.

**SHERMAN STATUE:** To pay for the collection of materials, preparation, editing, proof reading, and supervision through the press of the volume (Senate Document Numbered Three hundred and twenty) authorized by concurrent resolution of Congress, numbered fifty-seven, Fifty-eighth Congress, second session, entitled "Sherman, a Memorial in Art, Oratory, and Literature, by the Society of the Army of the Tennessee, with the aid of the Congress of the United States," said amount to be disbursed by the engineer in charge of public buildings and grounds, seven hundred dollars.

Sherman statue.

Vol. 33, pt. 2, p. 2081.

### LEGISLATIVE.

Legislative.

#### PRINTING AND BINDING.

Public printing and binding.

Hereafter no book or document not having to do with the ordinary business transactions of the Executive Departments shall be printed on the requisition of any Executive Department or unless the same shall have been expressly authorized by Congress.

Restriction on printing books by Departments.

**SEC. 2.** That for the payment of the following claims, certified to be due by the several accounting officers of the Treasury Department under appropriations the balances of which have been exhausted or carried to the surplus fund under the provisions of section five of the Act of June twentieth, eighteen hundred and seventy-four, and under appropriations heretofore treated as permanent, being for the service of the fiscal year nineteen hundred and two and prior years, unless otherwise stated, and which have been certified to Congress under section two of the Act of July seventh, eighteen hundred and eighty-four, as fully set forth in House Document Numbered Two hundred and ninety-two, reported to Congress at its present session, there is appropriated as follows:

Claims certified by accounting officers.

Vol. 18, p. 110.

Vol. 23, p. 254.

#### CLAIMS ALLOWED BY THE AUDITOR FOR THE WAR DEPARTMENT.

Claims allowed by Auditor for War Department.

For contingencies of fortifications, two dollars and ninety-seven cents.

**SEC. 4.** That section thirty-six hundred and seventy-nine of the Revised Statutes of the United States is hereby amended to read as follows:

Expenditures  
in excess of ap-  
propriations  
forbidden.  
R. S., sec.  
3679, p. 723,  
amended.

Voluntary  
service.

Apportion-  
ment of appro-  
priations in  
monthly allot-  
ments to pre-  
vent deficien-  
cies.

Exceptions.

Penalty for  
violations.

"SEC. 3679. No Department of the Government shall expend, in any one fiscal year, any sum in excess of appropriations made by Congress for that fiscal year, or involve the Government in any contract or obligation for the future payment of money in excess of such appropriations unless such contract or obligation is authorized by law. Nor shall any Department or officer of the Government accept voluntary service for the Government or employ personal service in excess of that authorized by law, except in cases of sudden emergency involving the loss of human life or the destruction of property. All appropriations made for contingent expenses or other general purposes, except appropriations made for the fulfillment of contract obligations expressly authorized by law, or for objects required or authorized by law without reference to the amounts annually appropriated therefor, shall, on or before the beginning of each fiscal year, be so apportioned by monthly or other allotments as to prevent undue expenditures in one portion of the year that may require deficiency or additional appropriations to complete the service of the fiscal year; and all such apportionments shall be adhered to except when waived or modified in specific cases by the written order of the head of the Executive Department or other Government establishment having control of the expenditure, but this provision shall not apply to the contingent appropriations of the Senate or House of Representatives; and all such waivers or modifications, together with the reasons therefor, shall be communicated to Congress in connection with estimates for any additional appropriations required on account thereof. Any person violating any provision of this section shall be summarily removed from office and may also be punished by a fine of not less than one hundred dollars or by imprisonment for not less than one month."

\* \* \* \* \*

Approved, March 3, 1905.

Mar. 3, 1905.  
Vol. 33, p.  
1260.

[H. R. 19178.]  
[Public, No.  
222.]

Apalachicola  
and East St.  
Mary rivers,  
Fla.  
Apalachicola  
and Northern  
Railway may  
bridge.

**CHAP. 1489.**—An Act To authorize the Apalachicola and Northern Railway to construct and maintain a bridge across the Apalachicola River and the East Saint Mary River.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Apalachicola and Northern Railway, a corporation created and existing under and by virtue of the laws of the State of Florida, be, and is hereby, authorized to construct and maintain a railroad bridge across the Apalachicola River in the southwest quarter of section twenty-two, in township eight south, range eight west, and across the East Saint Mary River, a branch of the Apalachicola River, in the southwest quarter of section

six, in township eight south, range seven west, in Franklin County, in the State of Florida.

SEC. 2. That said bridges shall be constructed with a draw, so that a free and unobstructed passage may be secured to all vessels and other water craft navigating said rivers. Drawbridges.

SEC. 3. That any bridge built under this Act and subject to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same of the mails, the troops, and the munitions of war of the United States, or passengers or freight passing over said bridges, than the rate per mile paid for the transportation over the railroads leading to said bridges, and equal privileges in the use of said bridges shall be granted to all telegraph and telephone companies; and the United States shall have the right of way for postal telegraph and telephone purposes across said bridges, without charge therefor. Lawful structures and post routes.  
Telegraph, etc., rights.

SEC. 4. That any bridge authorized to be constructed under this Act shall be built and located under and subject to such regulations for the security of navigation of said rivers as the Secretary of War shall prescribe, and to secure that object the said corporation shall submit to the Secretary of War, for his examination and approval, a design and drawing and a map of location of each bridge; and until the said plans and locations of the bridges are approved by the Secretary of War the bridges shall not be commenced or built, and should any change be made in the plans of either of said bridges during the process of construction, such change shall be subject to the approval of the Secretary of War, and any change that may be required by the Secretary of War in either of said bridges after their completion, shall be made by the corporation or persons owning or operating said bridges, at their own expense. Secretary of War to approve plans, etc.  
Changes.

SEC. 5. That the draws of the bridges herein authorized to be constructed shall be opened promptly upon reasonable signal for the passing of boats; and said corporation shall maintain, at its own expense, from sunset to sunrise, such lights or other signals on said bridges as the Light-House Board shall prescribe. Opening draws.  
Lights.

SEC. 6. That all railroad companies desiring the use of said bridges shall have and be entitled to equal rights and privileges relating to the passage of railway trains over the same and over the approaches thereto upon the payment of reasonable compensation therefor; and in case the owner or owners of said bridges and the railroad company or companies desiring to use the same shall fail to agree upon the terms with reference to the use of same all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties. Use by other companies.  
Compensation.

Amendment. SEC. 7. That the right to alter or amend this Act is hereby expressly reserved.

Time of construction. SEC. 8. That this Act shall be null and void unless the bridges herein authorized are commenced within one year and completed within three years from the date of approval hereof.

Approved, March 3, 1905.

Mar. 3, 1905.  
Vol. 33, p.  
1261.

[S. 6841.]  
[Public, No.  
223.]

**CHAP. 1490.**—An Act To authorize the Pensacola, Alabama and Western Railroad Company, a corporation existing under the laws of the State of Florida, to construct a bridge over the Tombigbee River, in the county of Lowndes, in the State of Mississippi, and to construct a bridge over the Alabama River, between the counties of Clarke and Monroe, in the State of Alabama, and to construct a bridge over the Black Warrior River, between the counties of Greene and Marengo, in the State of Alabama.

Tombigbee,  
Alabama, and  
Black Warrior  
rivers, Miss.  
and Ala.  
Pensacola,  
Alabama and  
Western Rail-  
road Company  
may bridge.

Railway,  
wagon, and  
foot bridges.

Litigation.

Proviso.  
Existing laws  
not affected.

Lawful struc-  
tures and post  
routes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Pensacola, Alabama and Western Railroad Company, a corporation existing under the laws of the State of Florida, be, and is hereby, authorized to construct, operate, and maintain a bridge over the Tombigbee River, in the county of Lowndes, in the State of Mississippi, at a point to be approved by the Secretary of War, a bridge over the Alabama River between the counties of Clarke and Monroe, State of Alabama, at a point to be approved by the Secretary of War, and a bridge over the Black Warrior River, between the counties of Greene and Marengo, in the State of Alabama, at a point to be approved by the Secretary of War. Said bridges shall be constructed to provide for the passage of railway trains, and, at the option of the persons by whom they may be built, may be used for the passage of wagons and vehicles of all kinds, for the transit of animals, and for foot passengers, for such reasonable rates of toll as may be approved from time to time by the Secretary of War; and in case of any litigation concerning any alleged obstruction to the free navigation of said rivers on account of said bridges the case may be tried before the circuit court of the United States in whose jurisdiction any portion of said obstruction or bridge is located: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers, or to exempt said bridges from the operation of same.

SEC. 2. That any bridge constructed under this Act and according to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same for the mails, the troops, and the

munitions of war of the United States than the rate per mile paid for their transportation over railroads or public highways leading to said bridges; and the United States shall have the right of way for telegraph, postal-telegraph, and telephone purposes across said bridges; and equal privileges in the use of said bridges shall be granted to all telegraph and telephone companies.

Telegraph,  
etc., rights.

Sec. 3. That if said bridges shall be constructed as drawbridges they shall be constructed with a draw over the main channel of the river at an accessible and the best navigable point, and said draw shall be opened promptly upon reasonable signal, for the passage of boats, and upon whatever kind of bridge is constructed the said company or corporation shall maintain, at its own expense, from sunset to sunrise, such lights or other signals as the Light-House Board shall prescribe.

Draws.

Lights, etc.

Sec. 4. That all railroad companies desiring the use of said bridges shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same, and over the approaches thereto, upon payment of a reasonable compensation for such use; and in case the owner or owners of said bridges and the several railroad companies, or any one of them desiring such use, shall fail to agree upon the sum to be paid, and upon the rules or conditions to which each shall conform in using said bridges, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties.

Use by other  
companies.

Compensation.

Sec. 5. That any bridge authorized to be constructed under this Act shall be built and located under and subject to such regulations for the security of navigation of said rivers as the Secretary of War shall prescribe, and to secure that object the said company or corporation shall submit to the Secretary of War, for his examination and approval, designs and drawings of the bridges, and a map of the location, giving, for the space of one mile above and one mile below the proposed location, the topography of the banks of said rivers, the shore lines at high and low water, the direction and strength of the current at all stages, and the soundings, accurately showing the bed of said streams, the location of any other bridge or bridges, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until the said plans and locations of the bridges are approved by the Secretary of War the bridges shall not be built; and should any change be made in the plans of said bridges during the progress of construction, or after completion, such change shall be subject to the approval of the Secretary of War; and said bridges shall be changed at the cost of the owners thereof, from time to time, as the Secretary of War may direct, so as to preserve the free and convenient navigation of said rivers.

Secretary of  
War to approve  
plans, etc.

Changes.

Amendment.

SEC. 7. That the right to alter or amend this Act is hereby expressly reserved.

Time of construction.

SEC. 8. That this Act shall be in force for the construction of bridges herein authorized are and completed within three years from the date of approval hereof.

and unless the bridge shall be completed within three years of this Act.

Approved, March 3,

the county of Ouachita to  
the River, Arkansas.

and House of Representatives in Congress assembled, one of the counties of Arkansas created and organized under the laws of the said State, is hereby empowered to erect, construct, and maintain, by and through its proper officers, over the river, at or near Camden, in the county of Ouachita, State of Arkansas: *Provided*, That the plans of the said bridge are approved by the Secretary of War before the construction of the bridge is commenced. Said bridge shall be constructed to provide for the passage of wagons and vehicles of all kinds, for the transit of animals, and for foot passengers, under such rules and regulations as may be laid down by the proper officers of said county under the laws of the said State of Arkansas.

Lawful structure and post route.

Telegraph, etc., rights.

Time of construction.

Amendment.

SEC. 2. That the bridge shall be a lawful structure, and shall be known and recognized as a post route, and shall enjoy the rights and privileges of other post-roads of the United States, and no charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal, telegraph, and telephone purposes; and any changes in the said bridge which the Secretary of War may require in the interest of navigation shall be made by the person or corporation owning or operating the same, at their own expense.

SEC. 3. That this Act shall be null and void if actual construction of said bridge herein authorized shall not be commenced in one year and completed within three years from the date of approval hereof.

SEC. 4. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 3, 1905.

**HAP. 1504.**—An Act To authorize the Missouri Central Railroad Company to construct and maintain a bridge across the Missouri River, near the city of Saint Charles, in the State of Missouri.

Mar. 3, 1905.  
Vol. 33, p.  
1272.

[H. R. 19097.]  
[Public, No.  
237.]

*it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*

That the Missouri Central Railroad Company, a corporation of the State of Missouri, is hereby authorized to construct, maintain, and operate a railroad bridge,

Missouri  
River.  
Missouri  
Central Rail-  
road Company  
may bridge,  
near St.  
Charles, Mo.

single or double track for railroad traffic, across the Missouri River connecting the counties of Saint

Louis and Saint Louis, in the State of Missouri, at the point

about three and a half miles south of the city of Saint Charles, in the county of Saint

Charles, at a point due south in Saint Louis County in the State of Missouri.

The bridge, when built in accordance with the provisions of this Act, shall be a legal structure,

and shall be used for railroad and highway purposes.

That the bridge authorized to be constructed

Secretary of  
War to ap-  
prove plans,  
etc.

under this Act shall be located and built under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the railroad company shall submit to the Secretary of War, for his examination and approval, a design and drawing of the bridge and a map of the location, giving for the space of one mile above and below the proposed location the depth and currents at all points of the same and the location of any other bridge or bridges, together with all other information touching said bridge and river as may be deemed requisite by the Secretary of War to determine whether said bridge when built will conform to the provisions of this Act and cause any serious obstruction to the navigation of the river or injuriously affect the flow of water.

**SEC. 3.** That the Secretary of War is hereby authorized and directed, upon receiving said plan and map, and upon being satisfied that a bridge built on such a plan and at said locality will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water, to notify the said company that he approves the same, and upon receiving such notification the said company may proceed to the erection of said bridge, conforming strictly to the approved plan and location. But until the Secretary of War shall approve the plan and location of the said bridge, and notify the said company of the same in writing, the bridge shall not be built or commenced, and should any change be made in the plan of the bridge during the progress of the work thereon such change shall be subject likewise to the approval of the Secretary of War.

Construc-  
tion.

Changes.



**Railway, wagon, and foot bridge.** SEC. 4. That said bridge shall be constructed to provide for the passage of railroad trains, whether the same be operated by steam, electricity, or otherwise, and at the option of the corporation by which it may be built may be used for the passage of wagons, passenger cars, electric motors, and vehicles of all kinds, for the transit of animals and for foot passengers and all kinds of common travel or communication for such reasonable rates of toll as may be approved from time to time by the Secretary of War.

**Lawful structure and post route.** SEC. 5. That the bridge shall be a lawful structure, and shall be known and recognized as a post route, and shall enjoy the rights and privileges of other post-roads of the United States, and no charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States. Equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal, telegraph, and telephone purposes; and any changes in the said bridge which the Secretary of War may require in the interest of navigation shall be made by the person or corporation owning or operating the same at their own expense.

**Telegraph, etc., rights.** SEC. 6. That the said bridge herein authorized to be constructed shall be kept and managed at all times to afford proper means and ways for the passage of vessels, barges, or rafts, both by day and by night, and there shall be displayed on said bridge, by the owners thereof, from sunset to sunrise, such lights or other signals as the Light-House Board may prescribe, and such changes shall be made from time to time in the structure of said bridge as the Secretary of War may direct, at the expense of the said company, in order the more effectually to preserve the free navigation of said river.

**Aids to navigation.** SEC. 7. That this Act shall be null and void unless the bridge herein authorized be commenced within one year and completed within three years from the date hereof.

**Lights, etc.** SEC. 8. That Congress shall have power at any time to alter, amend, or repeal this Act.

Approved, March 3, 1905.

Mar. 3, 1905.  
Vol. 33, p.  
1273.  
[H. R. 19098.]  
[Public, No.  
238.]

Missouri  
River.  
Missouri  
Central Rail-  
road Company  
may bridge, at  
Glasgow, Mo.

**CHAP. 1505.**—An Act To authorize the Missouri Central Railroad Company to construct and maintain a bridge across the Missouri River near the city of Glasgow, in the State of Missouri.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Missouri Central Railroad Company, a corporation of the State of Missouri, is hereby authorized to construct, maintain, and operate a railroad bridge with a single or double track for railroad traffic across the

Missouri River, at or near the city of Glasgow, connecting the counties of Howard and Saline, in the State of Missouri. The said bridge, when built in accordance with the requirements of this Act, shall be a lawful structure, and may be used for railroad and highway purposes.

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the railroad company shall submit to the Secretary of War, for his examination and approval, a design and drawing of the bridge and a map of the location, giving for the space of one mile above and below the proposed location the depth and currents at all points of the same and the location of any other bridge or bridges, together with all other information touching said bridge and river as may be deemed requisite by the Secretary of War to determine whether said bridge when built will conform to the provisions of this Act or cause any serious obstruction to the navigation of the river or injuriously affect the flow of water.

SEC. 3. That the Secretary of War is hereby authorized and directed, upon receiving said plan and map and upon being satisfied that a bridge built on such a plan and at said locality will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water, to notify the said company that he approves the same, and upon receiving such notification the said company may proceed to the erection of said bridge, conforming strictly to the approved plan and location. But until the Secretary of War shall approve the plan and location of the said bridge and notify the said company of the same in writing, the bridge shall not be built or commenced, and should any change be made in the plan of the bridge during the progress of the work thereon, such change shall be subject likewise to the approval of the Secretary of War.

SEC. 4. That said bridge shall be constructed to provide for the passage of railroad trains, whether the same be operated by steam, electricity, or otherwise, and, at the option of the corporation by which it may be built, may be used for the passage of wagons, passenger cars, electric motors, and vehicles of all kinds, for the transit of animals and for foot passengers and all kinds of common travel or communication, for such reasonable rates of toll as may be approved from time to time by the Secretary of War.

SEC. 5. That the bridge shall be a lawful structure, and shall be known and recognized as a post route, and shall enjoy the rights and privileges of other post-roads of the United States, and no charge shall be made for the transmission over the same of the mails, troops, and munitions of war of the United States. Equal privileges in the use

Secretary of war to approve plans, etc.

Construction.

Changes.

Railway wagon, and foot bridge.

Lawful structure and post route.

Telegraph etc., right

Changes.	of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal, telegraph, and telephone purposes; and any changes in the said bridge which the Secretary of War may require in the interest of navigation shall be made by the person or corporation owning or operating the same, at their own expense.
Aids to navigation.	SEC. 6. That the said bridge herein authorized to be constructed shall be kept and managed at all times to afford proper means and ways for the passage of vessels, barges, or rafts, both by day and by night, and there shall be displayed on said bridge by the owners thereof, from sunset to sunrise, such lights or other signals as the Light-House Board may prescribe, and such changes shall be made from time to time in the structure of said bridge as the Secretary of War may direct, at the expense of the said company, in order the more effectually to preserve the free navigation of said river.
Lights, etc.	
Time of construction.	SEC. 7. That this Act shall be null and void unless the bridge herein authorized be commenced within one year and completed within three years from the date hereof.
Amendment.	SEC. 8. That Congress shall have power at any time to alter, amend, or repeal this Act.
Approved, March 3, 1905.	

Mar. 3, 1905. Vol. 33, pt. 2, p. 2071. **CHAP. 1801.**—An Act To reimburse the Illinois Central Railroad Company for damage to Union Depot at Louisville, Kentucky, by blasting in the Ohio River.

[H. R. 11604.]  
[Private, No. 1503.]

Illinois Central Railroad Company.

Payment to, on account of damages from blasting operations in Louisville and Portland Canal, Ky.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Treasury be, and he is hereby, authorized and directed to pay to the Illinois Central Railroad Company, out of any money in the Treasury not otherwise appropriated, the sum of sixty dollars and eighty-two cents for reimbursement of damages to the roof of the Union Depot and train shed at Seventh and River streets, Louisville, Kentucky, by blasting operations conducted by the Government in connection with the improvement of the Ohio River.

Approved, March 3, 1905.

## APPENDIX M M M.

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### TECHNICAL DETAILS OF ENGINEERING METHODS ON FORTIFICATIONS, AND RIVERS AND HARBORS.

#### FORTIFICATIONS.

- |   |   |
|---|---|
| 1. Defenses of the coasts of Maine and New Hampshire. | 5. Defenses of the coast of South Carolina.     |
| 2. Defenses of the Delaware River.                    | 6. Defenses of the coast of Georgia.            |
| 3. Defenses of Hampton Roads, Virginia.               | 7. Defenses of Galveston, Texas.                |
| 4. Defenses of the Cape Fear River, North Carolina.   | 8. Defenses of the mouth of the Columbia River. |

#### RIVERS AND HARBORS.

9. Data and illustrations concerning the operation of U. S. snag boats *Gen. S. M. Mansfield* and *Capt. C. W. Howell*, and of U. S. dredges *Gen. H. M. Robert* and *Gen. C. B. Comstock*.
- 

### FORTIFICATION WORKS.

#### M M M I.

##### DEFENSES OF THE COASTS OF MAINE AND NEW HAMPSHIRE.

[Officers in charge, Maj. S. W. Roessler and Lieut. Col. W. M. Black, Corps of Engineers.]

In constructing two 6-inch batteries in this district during the past fiscal year, the following methods were used to prevent leakage in the rooms under the traverses:

(a) The entire roof cover was divided into blocks believed to be small enough to expand and contract under ranges of temperature from  $+90^{\circ}$  F. to  $-20^{\circ}$  F., without cracking, with well-defined planes of weakness running parallel with the parade wall of the traverse.

(b) The slope of the top surface was made continuous to the ridge, and the surface was troweled to a smooth finish.

(c) The top surface was ridged along the upper edges of the planes of weakness to induce a flow of water reaching the concrete away from the anticipated cracks.

(d) Flashings of sheet iron were built in the blocks so as to form gutters in the planes of weakness, so sloped as to deliver the water carried inside the walls.

(e) Over the top surface in one of the traverses was placed a layer of hydrolene B, 1 inch thick, covered while the hydrolene was hot by a lapped joint layer of tarred paper to provide a better bearing surface for the superposed materials. After the hydrolene had set the upper surface of the tar paper was swabbed with hot hydrolene and a

layer of hollow tile placed immediately, with the hollows running down the slope, and the interstices between adjacent tiles over planes of weakness filled with hydrolene. An angle iron, with its top flush with the lower side of the tile hollows, was bolted along the bottom of the waterproof cover on each side of the traverse roof to prevent the tiles from slipping. The earth fill was placed on the tile. The cost of the hydrolene, paper, and tile in place was 79 cents per square yard. The other traverse was left uncovered in order to see what leakage would take place without the waterproofing.

The arrangement of the blocks, flashings, etc., is shown in the accompanying drawings, Plates A and B.

Hydrolene makes a poor bond with a smooth concrete surface. A good bond can be obtained by first swabbing the concrete with a thin coat of coal tar. The bond between the hydrolene and tarred paper and between hydrolene and tile is good.

The waterproofing above described was placed in the traverse in October and November, 1904, and has been watched closely since. During the winter the temperature fell to 15° F., and during June and July rose to 90° F. The hydrolene did not become brittle in the low temperature, and has showed no tendency to run in the high temperature. In an office test under a pressure of 1½ pounds per square inch, temperature of about 70° F., it compressed slightly and squeezed toward the free sides to a limited extent.

The finished traverse showed two small leaks in the powder-passage side walls before being waterproofed. Since the waterproofing has been in place there have been no signs of leakage.

The melting point of the hydrolene B used was 215° F. When melted the hydrolene is very fluid and requires care in the placing to obtain the required even thickness on the inclined surface. Since the hot hydrolene melts the previous coat upon which it is placed and forms a perfect weld when the old surface is clean, it was found best to flow it on in thin layers. When making a coal tar bond the coal tar is swabbed on the concrete and allowed to cool. The hot hydrolene when placed welds to the coal tar.

The object of the hollow tile was to provide underdrainage for the earth cover.

Sheet copper has been used for waterproofing over the traverses in several of the batteries of this district. In all of these the copper shows signs of corrosion, and in one finished in 1904, from which the earth fill has been partly removed, the original finished surface has disappeared from the copper and pitting has begun. In several the soldered seams have opened at points, apparently due to expansion and contraction under temperature changes, no expansion joints having been provided.

In the 3-inch battery at Fort Williams the waterproof coat was made as follows:

The concrete was first coated with hot coal tar. On this were placed three layers of two-ply tarred paper coated with hot coal tar. On this was laid 16-ounce sheet copper with folded lap joints which were soldered on the outside of the fold. The cost of this waterproofing was \$3.22 per square yard.

To test the durability of copper when exposed to the action of salt water two test pieces of 16-ounce commercial sheet copper were used. One piece 4 inches square was suspended horizontally in air. A second

piece of the same sheet of copper was soldered into box form, with an inclined bottom resting on concrete, and one free side, to simulate the condition in a traverse roof. This box was filled with sand, provision being made for free drainage. Each test piece has been wetted daily with sea water since January 21, 1905. The test piece in air showed no corrosion at first. On July 10, 1905, it was found to be coated with verdigris, though apparently not much pitted. The test piece under sand was examined July 10. The sides are badly corroded and in places pitted. The inclined bottom was bright and clean. The experiments are being continued.

The tests were made because of very rapid corrosion of copper-wire window screens in air sheltered from rain, observed by the writer on the Isthmus of Panama.

In the 6-inch battery, of which the traverse has been left uncovered and without waterproofing, the precautions taken with the concrete seem to have been reasonably satisfactory. The past winter is considered one of the most severe experienced in this region for many years. There was an unusual amount of rainfall in the month of June, and since the latter part of the month the temperature has been high with heavy rains at intervals. The joints at the planes of weakness have opened according to expectation, but no other cracks have appeared. During rains water flows out of the ends of the plane-of-weakness joints above the level of the flashings and not below.

One small leak has appeared in the center of the ceiling of the magazine immediately under the intersection of two planes of weakness in the overhead cover. No other leaks have appeared in the rooms. In the powder passage during rains, damp spots show in the walls near the ends, apparently due to imperfections in the concrete in or near the curved projections of the traverse cover over the parapet at the sides of the two emplacements.

In using wet concrete great care must be taken to prevent separation of the fine and coarse ingredients, and loss of water-laden cement if the haul from the mixer to the site be long. If there be leaks in the concrete forms, there seems also to be a tendency to form channels in the interior of the concrete mass while being placed. At Fort Preble, while the concrete of one of the massive traverse side walls was under construction, a flow was noticed through the concrete form at one spot which persisted until the entire mass had been placed and set.

*Ventilation.*—In the new batteries the ventilation is obtained by 12-inch pipes with ship cowl ventilators. The cowls are removable, and the openings can be closed by solid deck plates. Provision is made for closing the ventilators on the inside, for positive drainage through pipes accessible for cleaning, and for easy removal of wind-borne substances which might enter the cowl. The arrangement adopted is shown on Plates C and D.

Tests made showed that during the months of August, September, and October, 1904, in this locality, condensation in magazines, store-rooms, and galleries was practically prevented by having a free movement of air. During the winter and early spring months there was no condensation. In the months of May, June, and July, 1905, to date, there was condensation at times where the rooms were kept open continuously, and but little where they were opened in dry weather and kept closed when the relative humidity was great. At the most, when the rooms were kept open, the condensation was not sufficient to pro-

duce sloppiness, and the floors were not wet, but damp, and the condensed water on the metal work and walls dried without dripping, showing in the most unfavorable case a marked advance over the earlier condition of the same rooms when there was no regular ventilation and the doors were kept closed, excepting at long intervals when opened for drill purposes. The water of condensation disappeared most quickly and the general dampness was least in the rooms having the best ventilation.

Rooms lined with tile showed dampness less than unlined rooms, but unventilated closed rooms, even when lined with porous brick, show dampness.

To permit the free circulation of air in the batteries when desired, the new works are provided with a set of heavy iron mesh doors in addition to the solid doors, so that outer and magazine entrances of a battery can be locked securely and the battery be made safe against idle or malicious interference without cutting off the air supply.

*Sponge and rammer racks.*—Complaint having been made that the provision made in the type plans of 6-inch batteries for the sponge and rammer staves would cause the heads to protrude into a needed passageway, the slots in the walls were widened and small carriages provided for easy withdrawal of the implements, as shown on Plate E.

*Waterproof platform pavement.*—In some of the older contract-built batteries the loading platforms were badly cracked and leaky. These are being repaired. The old surface is being broken up and removed. Lines of hole 6 inches in diameter are drilled to the required depth with intervals of 9 inches from center to center of holes, and with a distance of about 2 feet between the lines. The concrete left in place is then removed by wedging. Though the concrete is quite hard, this is accomplished without difficulty. The total cost of removing the old surface is \$2 per square yard.

The remaining bed is then brought to a true surface, having a slope of 1 inch to 5 feet with fine concrete. The adjacent parapet and traverse walls are undercut for a depth of 6 inches and a width of 6 to 12 inches. The entire surface is then covered with a three-fourths inch coat of hydrolene which is carried over the entire surface of the undercuts, being there bonded to the concrete by coal tar. On the hydrolene is placed either one layer of tar paper or two layers of hydrex felt. On this is placed hollow tile, bonded to the waterproofing with hydrolene, and with the hollows in line with the slope, but a gutter 6 inches wide is left along the traverse and parapet walls. Concrete paving is placed over the tiling and the gutter is covered with an angle iron bolted in place. The cost of the work in the one platform completed is \$12.64 per square yard.

The object of the tiling is to drain the waterproof layer. The gutter is to permit free expansion and contraction of the pavement, and to render the waterproofing accessible along the line of the vertical walls, where failure is most to be expected.

The platform has not been placed long enough to have been tested. The details are shown on Plate F.

*Powder-case racks for 6-inch battery magazines.*—The design of these racks which provide for floor drainage are sufficiently shown on Plate G. Their cost was \$81 per magazine for material.

*Sliding doors for 10-inch shot-hoist delivery.*—The design adopted for this district is shown on Plate H.

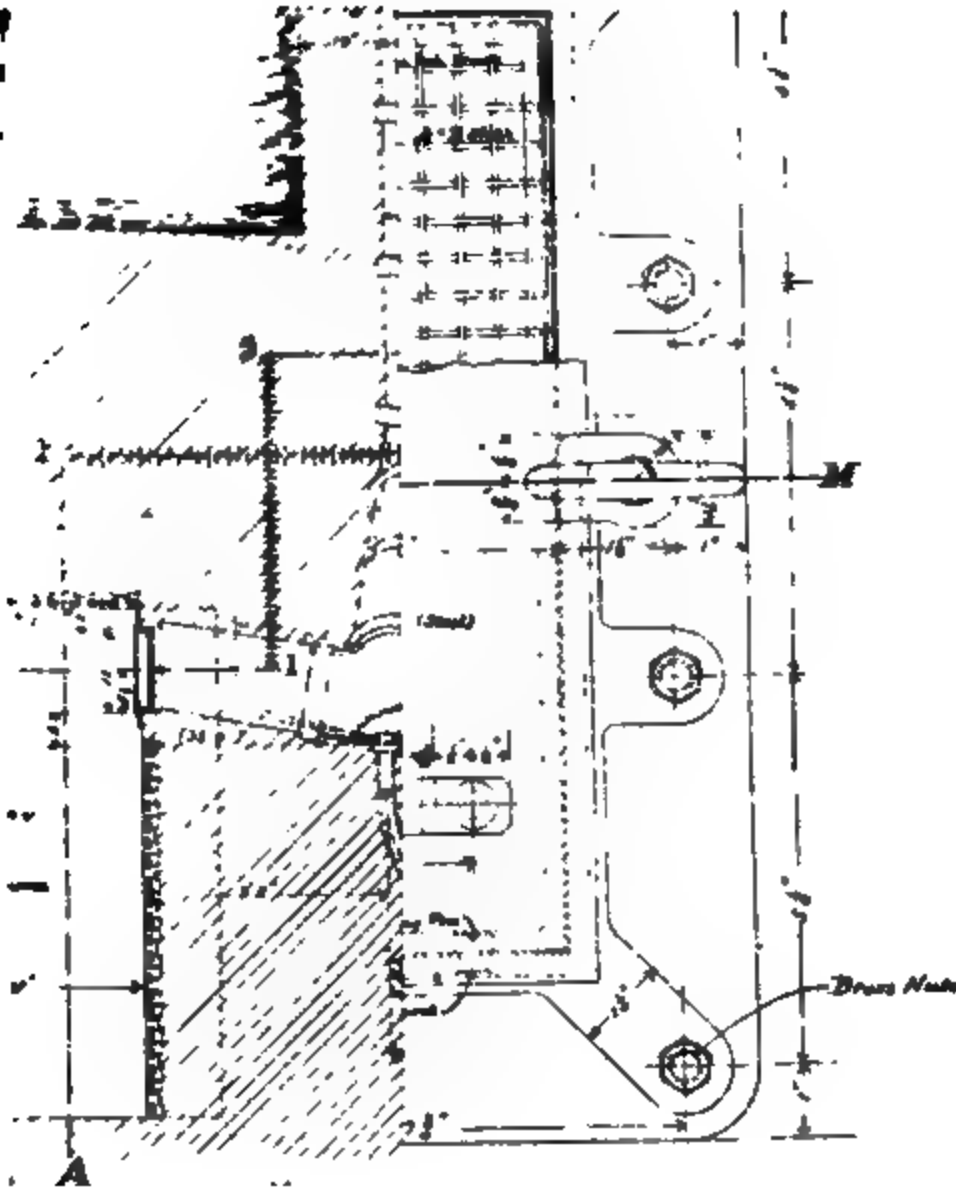


1771

1772

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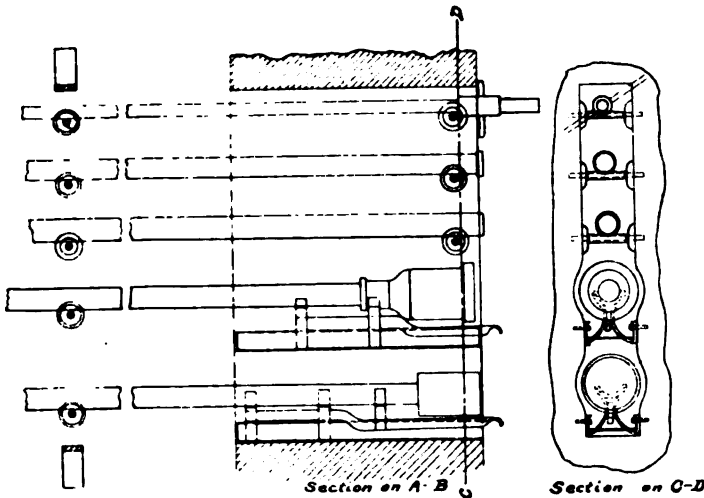
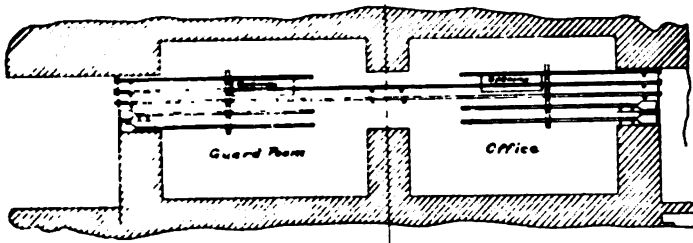


Note  
 when flange is to be fitted  
 no part of Lead-Block  
 is to be fitted as that  
 from which flange that  
 up right

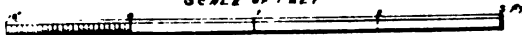
To occupy  
 empty space



E



SKETCH SHOWING RACKS FOR LOADING TOOLS.  
SCALE OF FEET



U.S. ENGINEER OFFICE  
PORTLAND, MAINE.

To accompany supplement to Annual Report  
for fiscal year ending June 30, 1906

*H. M. Rusk*

LIEUT. COLONEL CORPS OF ENGINEERS, U.S.A.

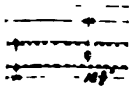


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ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

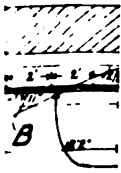






Scale 1/2

Prof. Thresh  
1/2



1/2



Plan of May

- Two (2) Flies
- Two (2)
- One (1)
- One (1)
- Twenty eight
- Fifty six (56)
- Twenty (20) 1/2
- Fifty six (56) 1/2
- (56)
- Twenty eight
- Nine (9) Corn
- Twenty eight

TAILS OF S

Scale 01







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## M M M 2.

## DEFENSES OF THE DELAWARE RIVER.

(Officer in charge, Capt. C. A. F. Flagler, Corps of Engineers.)

*Place storage magazine for smokeless powder.*—This magazine was constructed in accordance with the type plan in mimeograph No. 38 and supplement thereto, and was completed in May, 1904. The location is directly behind an earthen parapet and 5-inch battery, where it gets direct exposure to northwest, north, and northeast winds, but is sheltered from all other points of the compass. The building is exposed to the full rays of the sun during the day.

The following table gives a record for the fiscal year 1904-5 of the temperature of the air inside and outside the magazine taken at 4 p. m. daily.

The thermometer inside was suspended in the center of the magazine about 5 feet above the floor, and outside was in a wooden shelter with slat sides.

Date.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
	Outside.	In magazine.	Outside.	In magazine.	Outside.	In magazine.	Outside.	In magazine.	Outside.	In magazine.	Outside.	In magazine.
1	80	79	83	84	77	75	71	70	60	55	39	38
2	75	73	75	79	74	74	70	69	58	56	37	37
3	75	78	80	80	74	74	62	68	57	54	31	33
4	75	77	83	82	77	75	65	65	59	55	33	33
5	89	84	82	81	73	73	69	66	50	50	29	32
6	85	83	80	80	75	73	59	64	47	46	35	32
7	77	86	84	82	77	74	57	61	50	47	37	35
8	78	83	78	79	77	74	65	62	49	47	38	36
9	76	81	79	78	78	74	74	69	50	48	29	33
10	75	82	84	79	72	73	79	74	46	45	20	28
11	77	81	81	79	72	73	79	74	42	45	22	30
12	84	85	75	79	84	78	51	61	47	45	29	27
13	78	80	77	78	66	74	50	56	34	39	29	32
14	77	78	80	80	74	73	61	55	40	41	23	24
15	77	78	81	80	67	70	56	55	47	45	22	23
16	86	83	76	78	72	71	62	60	49	46	31	29
17	89	84	85	81	74	72	68	62	43	41	28	27
18	86	82	79	79	74	72	72	68	42	39	32	30
19	90	85	74	77	75	73	70	66	50	46	33	31
20	82	81	85	81	72	71	62	61	52	48	32	30
21	88	85	84	80	66	70	63	61	51	48	32	30
22	71	79	83	80	59	66	60	59	47	46	32	30
23	75	75	79	77	62	64	49	56	52	49	43	40
24	69	72	78	78	70	68	54	54	43	40	34	36
25	64	71	85	79	71	69	58	56	40	40	26	24
26	78	74	72	77	77	70	58	56	40	40	30	32
27	79	77	70	76	72	70	49	54	34	36	26	28
28	86	78	75	76	71	70	50	49	32	34	34	36
29	80	77	85	79	73	70	59	56	41	39	82	32
30	80	78	74	74	75	72	50	52	49	45	42	34
31	82	81	76	75	...	...	49	47	...	...	46	36

The high interior temperatures pertaining during the summer months raise a doubt as to the suitability of this magazine for the storage of smokeless powders.

*Waterproofing.*—At Fort Mott the superior crests of Batteries Arnold, Harker, and Kraysenbuhl were waterproofed with coal tar and sand. The tar was applied hot and spread over the concrete surfaces with rubber squeegees and then sanded. Joints were filled with the hot tar. A surplus of sand was put on and left for a few days and then

swept off. Two coats were put on over the traverses and one over the parapets.

The total surface covered, two coats, was 14,700 square feet, an one coat 19,600 square feet, 21½ barrels of coal tar being used, which gives a covering capacity of 2,279 square feet per barrel, one coat. The tar cost \$4.25 per barrel delivered at Fort Mott. The cost including materials and labor, was \$0.0074 per square foot, one coat.

In Batteries Arnold and Harker practically all percolation was stopped. The magazines are still damp, however, from condensation during the summer months, and throughout the year from dampness arising from the foundations, which are on a clay stratum with no underdrainage. In Battery Kraysenbuhl only the 6-foot-wide parapet around the circular platforms could be waterproofed, which had very little effect. Most of the leakage in this battery is from water running down the vertical walls, all around the battery, between the concrete and earth embankment.

At Fort Du Pont the superior slopes and all exterior walls of Battery Elder were given two coats of boiled linseed oil for waterproofing and for coloring the concrete surfaces to relieve the strain on the eyes from sunlight reflected from the natural concrete surfaces. The appearance is very good and the oil maintains itself well, with a need of renewal to the present time.

*Ammunition hoists, Battery Kraysenbuhl (5-inch).*—Two special chain hoists were installed in this battery in 1897, with chains 24 inches apart, center to center, with brass carriers for carrying fixed ammunition.

Guns arranged for separate ammunition were mounted by the Ordnance Department in 1901 and 1902, necessitating a change in the hoists, which was made in accordance with drawing herewith. The chains on the old hoists were moved to one side and used without change for carrying powder charges, and two more chains with special carriers added for carrying shot and shell, the shafts and winch frame being of sufficient length without change to accommodate the four chains.

The gearing to the motor was not changed and the chain speed is 7½ feet per minute, giving a delivery of 12.4 charges per minute for each hoist. This speed can be reduced by using a controlling rheostat on the motor or by placing a smaller pulley on the motor shaft. When not in use the delivery tables fold up and close the shaft openings.

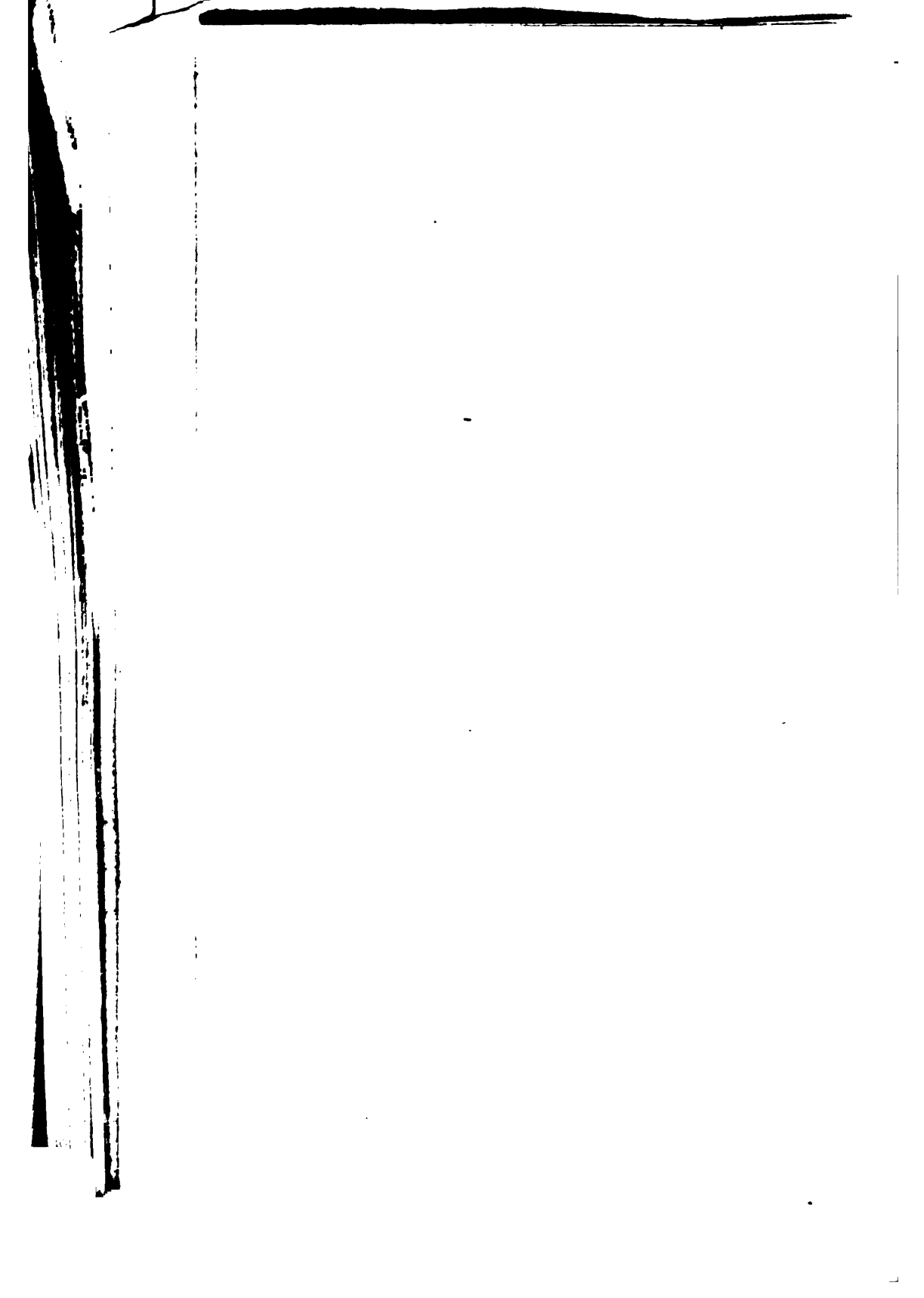
The motors are now fitted with solenoid-control self-starters, which act automatically when the circuit is closed. Hoists can be stopped or started by switches at the delivery tables.

*Cable clamps.*—Forty-eight cable clamps of special design have been placed in the walls of the two cable tanks now under construction. Details are shown on accompanying drawing.

These cable clamps, as shown, are intended to be used one for each drum of cable in the tank and provide for clamping both ends of the cable from each drum. Their use will avoid cumbering the walk ways on the walls of the tank, as has usually been the case where the cables have been fastened to the walls of the building, will give easy access to the cable cores for testing, and as each clamp bears a separate number will serve to identify all the cables in the tank without the use of tags on the cables. It will thus only be necessary to tag the separate cores of the cables.







# Torpedo Cable Clamp

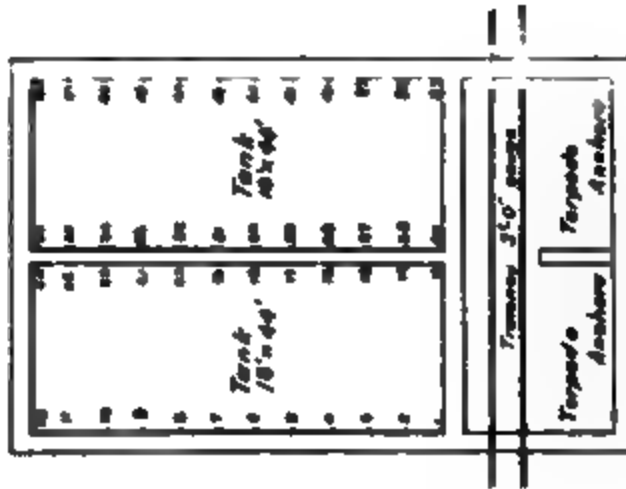
Prepared under the direction of

Captain C.A.F. Flagler, Corps of Engineers, U.S. Army.

Scale.



in  
re



Sketch  
showing location of clamps.  
Scale: 1/4"=1 ft.

U.S. Engineer Office,  
Wilmington, Delaware

To accompany Report to the Chief of  
Engineers, U.S. Army, dated August 9, 1905.

*C. A. F. Flagler*  
Captain, Corps of Engineers, U.S.A.





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U.S. Army,  
August 17, 1906  
to the Chief  
report of

U.S. Army.

Eng 59 1





**ARRANGEMENT AND  
HOLLOW BRICK IN  
CELLS OF NEW BATTERY**

PARTIAL ELEVATION ON LINE E-F

1/2" Brick

SECTION C-D

Fig 50 1

## M M M 3.

## DEFENSES OF HAMPTON ROADS, VIRGINIA.

[Officer in charge, Capt. E. Eveleth Winslow, Corps of Engineers.]

The following method has been adopted in recent battery construction to prevent condensation:

The ceilings of all the rooms in the new batteries have been built of specially designed shapes of porous tiling. Dovetailed projections of the concrete hold up X-shaped tiles, the lower ends of which serve as dovetails to hold up the intermediate tiles. Courses of these two forms of hollow brick run completely across each room, the joints in adjacent courses being broken. The concrete roof is supported by the usual crossed system of steel bars. The lower layers of these bars run parallel to the courses of the tiles, one bar being inserted between each pair of X-shaped tiles.

After the framing had been put in position the tiling was carefully laid upon it, with mortar joints. After this mortar had had time to set the concrete was laid on top, care being taken to push the work so rapidly as to obtain a good bond between the dovetail edges in the concrete and that surrounding the bars.

Wherever the walls were less than 3 or 4 feet thick they have been lined with hollow brick about  $3\frac{1}{4}$  inches thick. These brick were first laid with mortar joints against the surface of the framing, and the concrete was then placed behind them. It has been found that the best results were obtained by keeping the tile work only a course or two ahead of the concrete.

Where the walls were quite thick the lining was constructed of double hollow brick, making a layer, including the air space behind, 10 inches in thickness. Where this method was used the concrete wall was built up first, and, after the framing had been removed, the tiling was put in place, the bricks being laid alternately header and stretcher, so as to secure a bond between the tiling and the concrete lining.

In all tile-lined walls the projecting corners, wherever they occur, are composed of concrete, the tiles being omitted for from 8 to 12 inches from the corners.

In the heavy batteries the magazines and shell rooms were built as separate brick and frame structures, with copper roofs inside of the spaces in the mass of concrete. There was thus left a continuous air space completely around and over these magazine and shell rooms. These air spaces were utilized as routes for the electric wiring, and were furnished with a system of electric lights operated by separate switches on the distributing panels.

The accompanying drawing shows the above-described methods and the kinds of tiles used.

## M M M 4.

## DEFENSES OF THE CAPE FEAR RIVER, NORTH CAROLINA.

[Officer in charge, Capt. R. P. Johnston, Corps of Engineers.]

## THE PROTECTION OF THE SHORE LINE AT FORT CASWELL, NORTH CAROLINA—REPAIRS TO SEA WALL, CASE SYSTEM OF GROINS, SAND-BAG GROINS, OR JETTIES.

Between the latter part of 1902 and the early part of the present year 1905, an almost uninterrupted struggle was carried on for the protection of the shore line at Fort Caswell against the encroachments of the sea. During the first two years of this period, the damage inflicted by storms was so very extensive and such efforts at resistance as seemed possible with the small funds available were so unavailing that the work thought necessary to repair the damage and prevent further injury was estimated in 1902 at \$60,000, and in August, 1904, at \$83,600.

As the total available funds have amounted to only one-fourth of the latter sum, a number of different expedients were resorted to, most of them being considered as merely temporary, and designed chiefly to stay the progress of destruction until funds for stopping it could be allotted.

Some of these cheap expedients, particularly the sand-bag groins or jetties, have thus far proved so highly effective as to seem worthy of description.

The post of Fort Caswell is surrounded on its southern, eastern, and northeastern sides (the sides next to the sea and the river channel) by a concrete wall, which was built partly to protect the post from encroachments of the sea, and partly for the purpose of retaining the large amount of fill which was pumped on the post for the purpose of reclaiming the marsh lands and raising the general ground level to an elevation of about 12 feet above mean low water.

The history of the damages sustained and of the efforts to repair these damages and resist further encroachments will be best understood from the following extracts from reports submitted from time to time by the district engineer officer. Most of these extracts have no direct bearing on the "expedients" in question, but are quoted merely to show how serious the danger appeared to be; it is only the cheapness of the remedies as compared with the seriousness of the trouble that justifies this report.

Extract from report submitted December 15, 1902:

1. I have the honor to invite attention of the Department to the precarious condition of the sea wall around a portion of the Fort Caswell Reservation.

2. The sea wall was completed during the summer of 1901. It averages about 6 feet in height, its crest being at the level of about 12 feet above mean low water and its base about 6 feet above that datum. Outside of this wall there is a slight riprap protection built upon a fascine mattress. This mattress is about 12 feet in width, was placed right on the sand, and had its shore edge generally about 8 feet above mean low water, or 2 feet above the foundation of the sea wall. On top of this mattress the riprap was piled to a depth of perhaps 2 or 3 feet. Soon after this protection was placed outside the sea wall the action of the sea and wind was to pile sand upon it; but during this last fall, and especially within the past two or three

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lute breach  
4. With t  
evident tha  
riprap was p

week's, this action has been reversed and there has been a tendency to suck out the sand from this riprap, and even from under the mattress, allowing the latter to settle in several places exposing the bottom of the sea wall. This action was especially noticeable during the windstorm of November 27, 1902; and to prevent the sea wall from being thrown over by the pressure behind, the sand immediately in the rear of it was hastily thrown out by hand. There being a small balance on hand to the credit of this work, a quantity of stone was at once ordered and has been placed along the most threatened point. Two other windstorms since that date, the latter of which happened yesterday, have done additional damage to other points of this wall, and it is evident that the funds available are not sufficient for even the temporary safety of this structure.

3. Jutting out from this sea wall there are the ends of some old stone jetties, some of them built as far back as 1846. These jetties were placed there when the shore line was considerably back of its present location, and through their action this shore line was gradually pushed out. The ends of these jetties remaining outside the sea wall are too short to have any great effect in protecting the wall from turning out by the force of the sea.

This report contained an estimate of \$60,000, about two-thirds of which was for additional longitudinal protection (riprap resting on fascine mattresses) and one-third for extending the old jetties. Two days later the following additional report was submitted:

Three days later the following additional report was submitted:

Referring to my letter of the 15th instant, making request for an allotment for repairs to the sea wall at Fort Caswell, I have the honor to report in addition that a heavy windstorm which occurred on the 16th instant and continued through part of yesterday, did considerable damage to the wall. It was cracked in many places, and from undermining settled from 4 to 6 inches along considerable length; and it was only by immediate attention, removing the sand from behind the wall and rushing stone from less threatened points and placing it in front of the endangered point, that it was saved from complete destruction.

The wall for nearly its entire length is subject to severe attack in a windstorm

As the wall for nearly its entire length is subject to severe attack in a windstorm from one direction or another the entire wall is in need of attention, and unless funds are available at an early date I fear that it will not outlast the winter terms.

On account of scarcity of funds only \$5,000 was allotted, practically of which was expended for longitudinal protection.

Extract from report dated May 26, 1903:

Referring to my letter of December 15, 1902, reporting upon the condition of the wall at Fort Caswell, I have the honor to report that the wall has been still further damaged by the storm of May 9. The portion of the wall which has been repaired this spring was not affected, though the sea, at times, broke completely over the area in rear. The damage done by the storm was to the portion on the east side of the repaired part, some 400 feet of the wall to the westward and 1,900 feet to the eastward of the repaired part being badly damaged.

the northeastward of the riprap part being badly damaged.

my letter of December 15, 1902, I described the condition of the sea wall method of attack upon it by the sea. The part at that time most seriously undermined by the settlement into the sand of the riprap and partially suction away of the sand by the waves extended from old jetty on and the distance of about 900 feet. This last storm has continued this action along distance of about 900 feet. This last storm has continued this action along distance of about 900 feet above mentioned, causing the wall to settle, top forward and crack 600 feet above mentioned, some parts being in great danger of tumbling over in small many places,

Box 15, 1902 contained an estimate of \$80,000 for the repair

Letter of December 15, 1902, contained an estimate of \$60,000 for the repair and preservation of the wall, the proposed method being to widen by about 10 feet the riprap foundation of the riprap protection, to increase this riprap protection to make additions to the old stone jetties. Under date of December 29, 1902, an appropriation of \$5,000 was made for the repair of this wall. This was applied to the threatened part of the wall. The foundation mattress was widened and heavy riprap was placed as the funds would permit. The result has been that the mattress rapidly silting up, being now almost completely buried by the mattress, the mattress undoubtedly saving the wall in this last storm from an absolute collapse. Riprap undoubtedly is needed though, even here.

Some more stone is needed though, even here. Only the worst places could be treated, but it is now funds allotted only the worst places could be treated, but it is now her parts of the wall are in as great need of repairs. The original ed on a loosely constructed mattress 12 feet wide. The beach outside

es and cuts away, depending on the wind. At times it has nearly covered the ap, but a single day's storm will cut this away, suck the sand from under the nar- and loosely constructed foot mat, and allow the riprap to settle vertically. This rred at one place to a vertical depth of 4 feet during this last storm. As the of the sea wall is at an elevation of about 6 feet above mean low water the base exposed, the sand sucked from under it and the sea wall settles down and tips for- d and the fill behind it is partially washed away. To prevent this the protection he wall must be increased and to such an extent that it can not be destroyed in a le storm.

This report also asked for an allotment, but no funds were available hat time, and hence none were allotted.

A year later, May 9, 1904, an allotment of \$16,000 was made from appropriation of April 21, 1904, and the following is an extract m a report dated June 6, 1904, submitting plans for the proposed enditure of this sum:

In compliance with letter of May 9, 1904, I have the honor to submit the fol- ing plans for the expenditure of the \$16,000 to be allotted for the sea wall at Fort well, N. C., from the amount appropriated by act of April 21, 1904.

\* \* \* \* \*

The reference of the top of this wall was +12 (above mean low water) and the rence of its base was +6. As the mean rise and fall of the tide is about  $4\frac{1}{2}$  feet, ill be seen that the base of the wall was  $1\frac{1}{2}$  feet above mean-high-water mark. en the wall was built there was a sloping beach outside of it, the wall being from 10 to 150 feet or more landward from the high-water mark.

Since then the beach has built out (seaward) in most places, but along those ions where the damage has been most serious the beach has almost entirely dis- eared. As the wall does not extend even as low as high-water level, it can not st the encroachment of the sea, which washes the sand from under it and even oves much of that behind it. Mattresses loaded with stone placed just outside wall have impeded this action, but have not entirely prevented it.

The sand supporting the wall having been irregularly removed, the wall has erially settled, cracked into blocks varying from 2 to 20 feet in length, and has a thrust out of position, in some places tilting or sliding seaward under the thrust e fill behind it, in other places having been tilted backward under the thrust of riprap on the outside.

Since the damage is due primarily to the encroachment of the sea, the most ortant object is to arrest this encroachment, and, if possible, build up the beach. actual repair to the sea wall itself is altogether secondary, though in its pre- condition the broken portion of this wall is an eyesore and serves no useful ose.

Several methods of arresting the encroachment of the sea have been tried more ess thoroughly at Fort Caswell, but it can not be said that any of these have ed entirely successful. The sea wall itself, if considered as a protection against sea, is a complete failure throughout a considerable part of its length; if consid- as a retaining wall for the fill placed behind it, its failure is much less marked. mattress and riprap placed outside the wall and parallel to it have succeeded partially. The jetties, which were built a great many years before either sea or riprap (some of these jetties date back to 1846), are still intact and in good dition and seem to have been more efficacious than either of the others, though length of beach protected by each jetty is limited.

Low groins, consisting of plank nailed to stakes sunk in the sand (Case sys- ), have recently been tried to a very limited extent and seem to promise good ts, but their trial at Fort Caswell has been entirely too limited to warrant any ictions, though they have undoubtedly proved of great service in other places. y at least have the merit of extremely low cost and are thought worthy of a iful trial. This item is therefore provided for in the estimate.

In December, 1902, my predecessor submitted an estimate of \$60,000 for repair- and protecting this sea wall, the principal items being additional jetties, exten- of existing jetties, and providing riprap protection on the seaward side of the .

In May of 1903 he submitted another estimate of \$24,000 as the very smallest unt that would suffice to repair and preserve the wall, this estimate containing provision for jetties. As the damage suffered since that date is many times greater a that up to that time, it is evident that only a partial preservation and repair can oped for with the \$16,000 now available.

10. My estimate for exp

- (a) Low groins of plank,
- (b) 400 linear feet of riprap,
- (c) Mattress and riprap,
- (d) Rectifying and repair,
- (e) Contingencies, etc...

Total.....

Photographs illus- submitted with said herewith.

On March 20, 190 expedients that had

The following is

6. Referring to the the pamphlet above re Engineers on "The pr tidal and wave action partial success. It is point, and that their tion, and not to the conditions there prev valuable on beaches

7. The chief difficu were nailed would be to have been due chi too much of the stak

8. In experimenti of groin was evolue of the timber groins

9. The groin that sand and laid direc first place, of from about normal to the the low-water line. would be to make groins, but thus fa placed wherever au useful.

10. When the be another tier is laid from the base of th far the process cou

11. I know of n the credit for their S. F. Burbank. T plaster had been h this led to the sug having the same s or no tendency to placement by the tion that they ge

12. As for the tory, and unless \$16,000 made las an extremely rap and substantial.

13. The stret excavating behi sections into wh to lower the ha possible, and th and grout. By measure, and t

ending this sum is as follows:

etc.....	\$1, 500
p jetties.....	5, 000
seaward side of wall.....	5, 200
ng broken portions of wall.....	2, 800
.....	1, 500
.....	16, 000

ting the condition of the wall at that time were  
ort, copies of said photographs being inclosed

a report was submitted describing the various  
n adopted and the results obtained thereby.  
xtract from said report:

system of groins, which constitutes the chief theme of  
to (Paper 944, Transactions of American Society of Civil  
n and improvement of foreshores by the utilization of  
ese groins have been tried at Fort Caswell with only  
el, however, that these groins are applicable at this  
ailure was due to faults in their construction and loca-  
t the groins could not be successfully used under the  
In fact, indications are that this system would be very  
that at Fort Caswell.

ntered was that the stakes or piles to which the boards  
up, or pulled up by their buoyancy. This is believed  
e fact that the stakes were not sawed off short enough;  
for the waves to act upon.

ese pile and plank groins, however, a different form  
as thus far proved highly successful, and further tria-  
ore abandoned.

d successful consists merely of tow sacks filled with  
he sand of the beach. Each groin consists, in the  
rows of sand bags placed side by side on the sand,  
extending from about mean tide to a few feet below  
ly the best arrangement under ordinary conditions  
l between groins about equal to the length of the  
ule has been followed at Fort Caswell, groins being  
f the beach at low tide indicated that they would be

up to the top surface of the first tier of sand bags  
ess is continued till the beach is built out far enough  
leave the latter reasonably safe from attack. How  
I would, of course, depend on conditions.

ance of the use of sand bags for this purpose, and  
at Fort Caswell is due chiefly to Assistant Engineer  
st suggested by accident. Some sacks of hardened  
each with a view to using them in a low jetty, and  
ks filled with sand would probably be better; for,  
s the material of the beach, they would have little  
too high they would, of course, be liable to dis-  
n only a single tier high they offer so little obstruc-  
ndisturbed.

orts at repairing it have also been highly satisfac-  
results the balance available from the allotment of  
fficient to hold it intact. The wall now presents  
up appearance, but nevertheless seems to be stable

s in the worst condition was repaired by simply  
lowing the numerous short and ragged blocks or  
oken to settle as low as possible, the effort being  
el. Each section was then rectified as nearly as  
ween contiguous sections were filled with concrete  
onolithic structure has been again secured, in a  
l injury has been sustained.

REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Three mattresses and stone jetties, each about 80 feet long, were placed in front of each, approximately normal to the wall, and so spaced as to divide the 570-foot beach between old jetties No. 2 and No. 3 (which stand at the ends of the reach) into four approximately equal intervals. These new jetties are built up at mean tide. A large quantity of sand has accumulated between them, pushing the low-water line seaward from 30 to 70 feet.

The above-described process of lowering the fragments of the wall proved difficult and expensive than had been expected, and the remainder of the wall was repaired simply by rectifying and reuniting the blocks without lowering and then driving a row of triple-lap sheet piling along the toe.

It was found that the use of as long and heavy sheet piles as would have been desirable, and the use of creosoted lumber was likewise impossible. The piles that have been used are only about 8 feet long. Some of them are composed of three by 10 inch planks; some of 1½-inch planks, and still others have a 1½-inch plank for the centerpiece and 1-inch planks on the outside.

Thus far, however, these piles have proved sufficient, and as their tops are well above high water and will probably be buried in sand, decay and the danger are not much to be feared.

It will be seen from the above, no work for the protection of the shore line seems necessary except a continuation of the work above outlined. Hence the work now recommended is merely the completion of said work, the estimate being as follows:

Sheet B. M. lumber, for sheet piles, at \$25 .....	\$550
and placing 500 linear feet sheet piling, at 25 cents per foot .....	125
100 cubic yards concrete to be used in building up and reshaping the sea wall .....	1,200
as has been lowered or otherwise misplaced, at \$12 per yard .....	325
groins .....	
Total .....	2,200

This will leave a balance of about \$3,000, which should be retained to repair structural damages, which are to be expected from time to time.

The beach at Caswell is continually changing, sometimes building out, sometimes scouring away, and no law governing the changes has yet been discovered. It would be premature to assume that the good results thus far obtained will be permanent. There have been several storms of considerable severity, however, at the beginning of the repairs above outlined, and no special damage has resulted. It is to be noted that can be said under the circumstances is that results are much better than would have been hoped last spring, in view of the condition the wall and beach were in at that time, and that no extensive repairs now seem necessary.

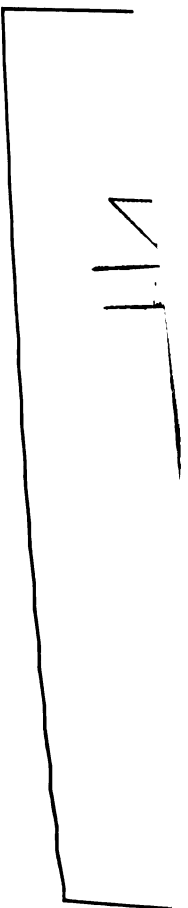
Although nearly six months have elapsed since the above report was made, and no further encroachments have been made, it would still be premature to predict continued success. Nevertheless, it appears to have been demonstrated that no ordinary storms are apt to produce

From the experience above outlined, it is justifiable to conclude that in cases where conditions are similar to those at Fort Caswell the use of heavy and expensive sea walls or jetties, either of concrete or riprap, is altogether unnecessary and often even useless.

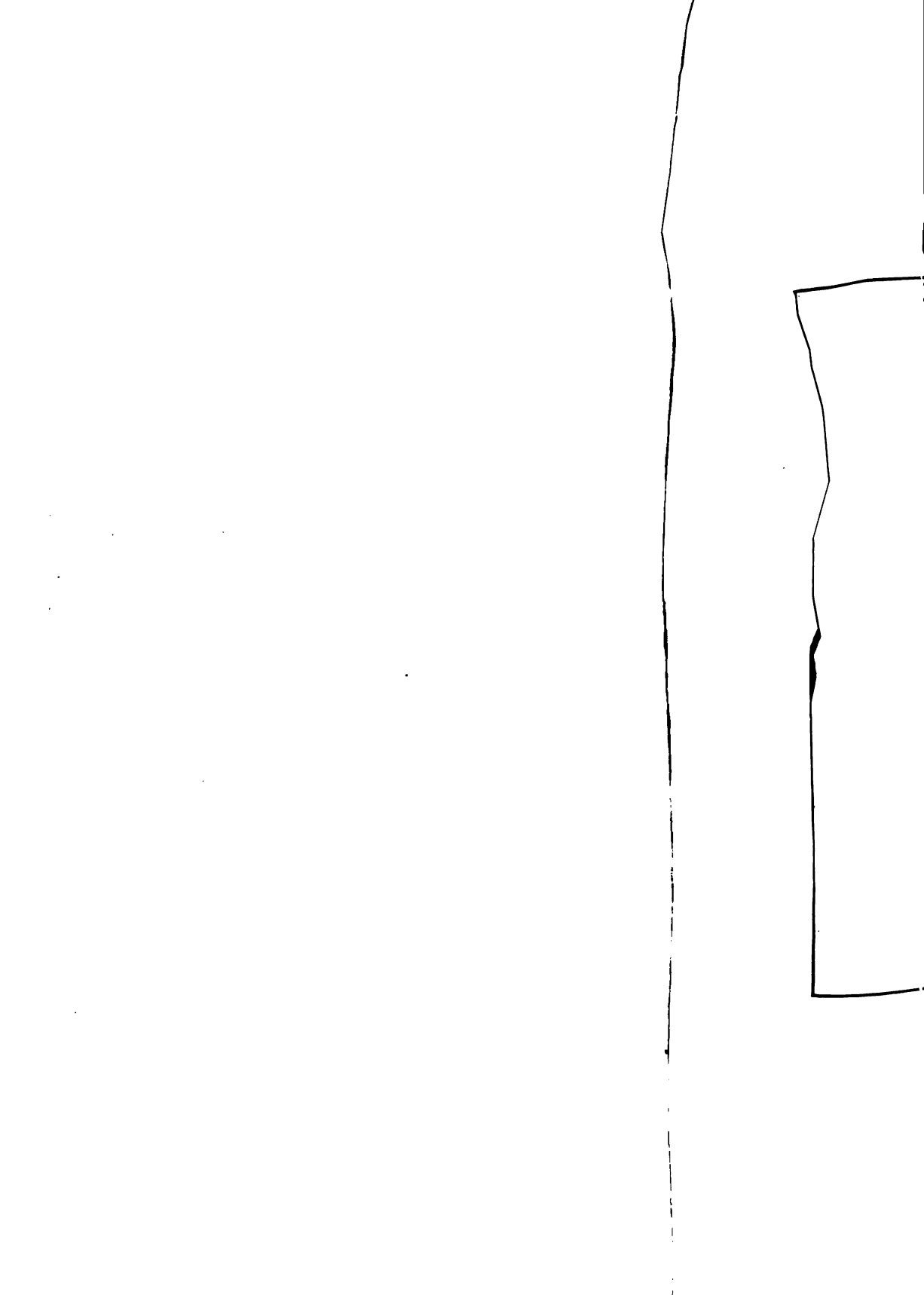
The beach between high and low water marks can be given a gentle slope and prevented from eroding, the force of the waves is deflected against gravity, and this treatment is certainly more rational than trying to resist this force by the construction of costly walls. Sand and bag groins offer an extremely economical and effective method of shaping and preserving the beach; and even if their use has to be repeated from time to time, they will still be far cheaper than the construction and maintenance of heavy walls. How long these will last after becoming embedded in the sand is not yet known; but it is known whether the preservation of the embedded bags is of material, though it probably is. It is possible that only the outer tiers of bags are effective, and that these tiers, if kept intact,



LOOKING SOUTH FROM JETTY NO. 3, ABOUT MAY 20, 1904.



EXTREME NORTH PORTION OF SEA WALL, ABOUT MAY 20, 1904.



LOOKING NORTH FROM JETTY NO. 3, ABOUT MAY 20, 1904.

## APPEND

will be just as effective  
are when the lower tides  
this does not seem probable  
few months or years,  
agency to scour will reach  
condition it was in when  
may be necessary to build  
does not seem probable  
some stage at which the  
cult, and its maintenance  
is believed to be far more  
stone walls or jetties.

## DEFENSES (

[Officer in c

## AMMUNI

The mortar battery  
four pits arranged to fire  
4 feet higher than the  
up a ramp to overcome  
forms are built upon a  
been expensive, besides  
To prolong the present  
as there would not have  
place the projectile on  
A hydraulic lift was  
Assistant Engineer W  
appended. Drawings, and  
accumulator weights have  
jectiles, with trucks, and  
used the men can not load  
is designed to lift the  
jectiles can be delivered  
work automatically with  
rate will be exceeded.  
but this high rate of  
trucks could be taken

CAPTAIN: I have the  
installed at Battery C  
Originally the project  
get them up to the level  
the projectile up a level  
reached. This work  
loaded truck up the  
convenient hold up  
The present lift will  
4 feet by hydraulic

riying tiers have rotted as they condition. But, as stated above, ay be found in the course of a tiers have rotted, that the tend- ie beach may then return to the ie bags was first begun, and it gain. While this is possible, it ich more probable that there is maintained without much diffi- ge by means of sand-bag groins than by means of concrete or

5.

OF SOUTH CAROLINA.

well, Corps of Engineers.]

MORTAR BATTERY.

96, and is of the old type, with . The loading platform is about ie ammunition has to be brought of elevation. The loading plat- n, and to lower them would have plicating the drainage question. i into the pit could not be done, nt height underneath the rail to

best solution of the problem by whose description of the lift is s, are also sent. In practice, the ted to raise two 800-pound pro- hen the 1,000-pound projectile is

It will be noted that the pump two minutes. Thus, four pro- nutes, but as the pump begins to umulator has fallen 6 inches this not allow a round every minute, but a short while and the extra hand.

UNITED STATES ENGINEER OFFICE,  
*Charleston, S. C., August 8, 1905.*

llowing report upon the hydraulic lifts

mortars had to be raised about 4 feet to ortars by pushing the truck loaded with bout 60 feet, before the upper level was men, as it took four men to push the o designed that only two men can get a

his difficulty by hoisting the projectiles



# THE CHIEF OF ENGINEERS, U. S. ARMY.

re as follows: A concrete well is built in one side of the pit  
 rance to the passage from which the projectiles are brought  
 rs of this well are placed angle-iron guides bolted to the  
 s slides a platform which is raised and lowered by the flow  
 movable part of which is attached to the lower side of the  
 slides over an inner cylinder, the outside surface of which  
 l has a brass gland and stuffing box on the lower end to  
 platform is designed to raise two projectiles at one trip in

assage leading to the pit, a few feet back from the entrance,  
 en cut for the installation of the following machinery: An  
 f two cylinders arranged like those of the platform, only  
 on weights weighing in all about 10,000 pounds resting on  
 a electrically driven pump of about 1.5 horsepower, with  
 switch, and an oil tank of galvanized iron.

or and the platform is placed a three-way cock with the  
 ng to the accumulator cylinder, the platform cylinder, and  
 e cock one way the accumulator is shut off and the pipe  
 er is connected with the one to the tank. By turning 90°  
 e accumulator and platform pipes are connected. By turn-  
 e direction the platform pipe is shut off and the pipe from  
 eted with the pipe to the tank.

t is as follows: The normal position of the three-way cock is  
 connected with the tank pipe and the accumulator pipe shut  
 n and the pump lifts the accumulator 4 feet in two minutes,  
 g the automatic switch at that height. The platform hav-  
 projectiles, in the meanwhile the lever of the cock is turned  
 rm and accumulator pipes, and the platform rises the 4 feet  
 e accumulator falling about 2 feet and starting the pump  
 t falls 6 inches. As soon as the trucks are rolled off the  
 wn to its former position, the oil flows back into the tank,  
 o position for the other two projectiles, this operation being  
 ay be necessary, the pump working all the time, except  
 in its highest position. When the drill is over, the accu-  
 by turning the lever through 90° from the position with  
 necting the accumulator with the tank, and then lowering  
 he lever 180° in the reverse direction, thus connecting the  
 e tank.

a of the lift everything worked satisfactorily. The pump  
 little more slowly than called for, as we only had a pressure  
 for which the motor on the pump is wound. With a pres-  
 o will raise the accumulator easily in the time specified. In  
 form or accumulator from falling too rapidly when the oil  
 o the tank, a quick-acting gate valve has been put on the  
 o as to let either the accumulator or platform fall in about  
 adjustment is made the lever handle is taken off and the  
 a piece of steel bar set in the concrete, so that the position  
 ered. This has been tested on one of the lifts and operated

WALTER M. SMITH, *Assistant Engineer.*

ineers.

MM M 6.

USES OF THE COAST OF GEORGIA.

arge, Lieut. Col. James B. Quinn, Corps of Engineers.]

the honor to transmit herewith a report on the  
 ase line for triangulation purposes, which it is  
 interest to the officers of the Corps who may have

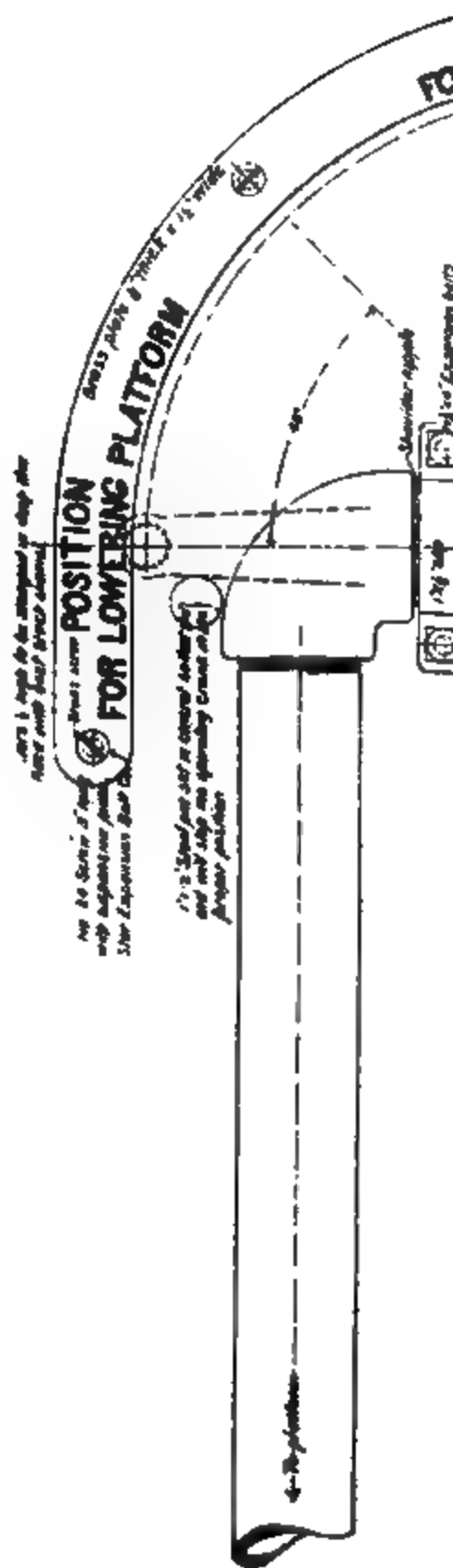
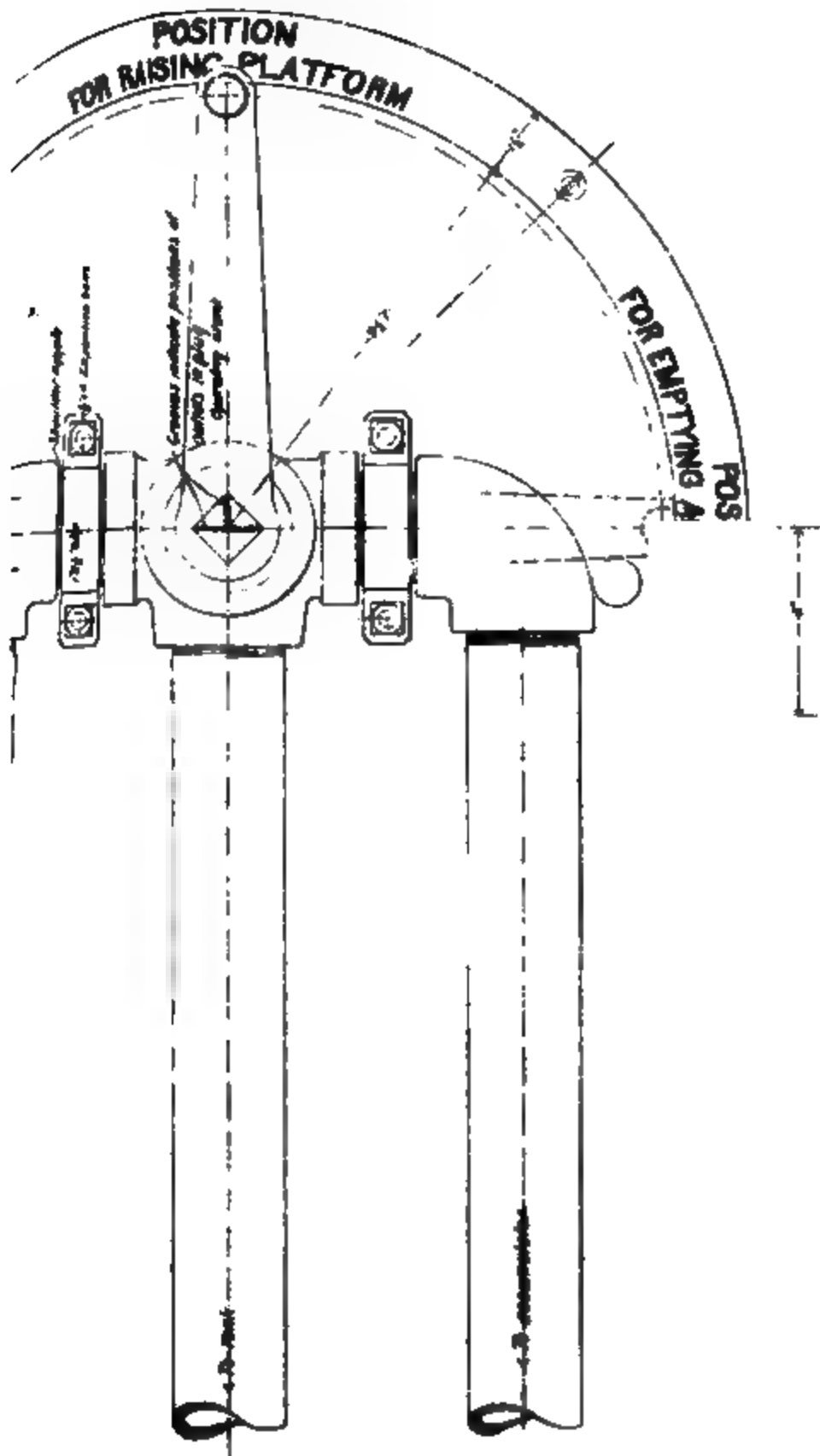


FIG. 2 SHOWING  
 PITS CA

RECEIVED AT THE HEADQUARTERS OF THE ENGINEERS



WING MANNER OF SETTING THREE WAY COCK FOR  
5 C AND D

11





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10/25/2014

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The method adopted is practically that devised by Mr. O. B. Wheeler, United States assistant engineer, the only departure being an improved "straining device," which appears to have added materially to the precision of the results.

The expedition and the economy with which base lines can be measured with this apparatus are important features which recommend it to all who require a base line sufficiently precise for any purpose,—in fact, with an automatic scribing device attached to the forward end of the chain, some refinement in the construction of the rear-end adjusting device, and more sensitive thermometers for determining the temperature of the chain, it appears that, with numerous measurements under nearly uniform conditions, almost any degree of precision is possible.

The accompanying photographs and drawings will serve to make the method and devices plainly understood, and the tables of results will display the credit due Mr. Cooper's painstaking efforts to secure accurate measurements with the apparatus.

Very respectfully,

JAMES B. QUINN,  
*Lieut. Col., Corps of Engineers.*

Brig. Gen. A. MACKENZIE,  
*Chief of Engineers, U. S. A.*

SAVANNAH, GA., December 29, 1904.

SIR: In accordance with your verbal instructions, I have the honor to make the following report on the work of measuring a base line on Tybee Island, Georgia.

The object of the work was to secure an accurate base line to be used for military purposes and to check up the old triangulation work done on Savannah Harbor.

The distance between the points desired could not be measured directly on account of trees, underbrush, intervening swamps, rough ground, and houses. It was therefore necessary to select a suitable place for measuring a base line and develop by means of a system of triangulation up to the points designated in your instructions. The front beach was the most favorable place, being almost an exact level, but its liability to change with every storm was considered a serious enough objection to this site to reject it in favor of the inner beach. This beach is not quite as level as the outer one, but was more conveniently located to develop from with the triangulation. It was therefore selected and a nearly level base was finally secured.

The base line was measured by a modification of the method used by Mr. O. B. Wheeler, United States assistant engineer, on the Mississippi and Missouri River work. Eight measurements were made in all kinds of weather and conditions, three of which were rejected. The mean length of the base line by the remaining five was found to be 5,078.79 feet, and the probable error determined by the method of least squares,  $\pm 0.002$  foot, or about one-fortieth of an inch. The proportional error of the mean is therefore 1 in 2,500,000, and of the measurement that differed the greatest amount from the mean, 1 in 635,000. The details of the base-line work are as follows:

A 300-foot band chain, made by Keuffel & Esser Company, was used (marked N B S No. 198). This was first sent to the Coast Survey office to be compared with their standards. It was returned with the following letter:

DEPARTMENT OF COMMERCE AND LABOR,  
BUREAU OF STANDARDS,  
Washington, November 10, 1903.  
Test No. 468.

Lieut. Col. JAMES B. QUINN,  
*Corps of Engineers, U. S. Army, Savannah, Ga.*

DEAR SIR: Inclosed please find certificate giving the corrections to the surveyor's chain submitted by you for verification, as per letter addressed to the Coast and Geodetic Survey. The chain was returned to you this day by Adams Express, collect, and I beg to inclose receipts in duplicate, as you requested.

Respectfully,

S. W. STRATTON, *Director.*



# REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

DEPARTMENT OF COMMERCE AND LABOR,  
BUREAU OF STANDARDS,  
Washington, November 10, 1903.  
Test No. 46

Report of verification of one band surveyor chain (N B S No. 198), submitted to the United States Engineer Office, Savannah, Ga.

The above tape was compared at a tension of 10 pounds avoirdupois and supported vertically through its entire length.

Comparisons were made at a mean temperature of 52° F., and assuming the coefficient of expansion of the tape is 0.000063 per degree Fahrenheit, the results of the spaces compared referred to 62° F. are as follows:

compared:	Actual length:
to 100 feet .....	100 feet—0.01 inch.
to 200 feet .....	200 feet—0.01 inch.
to 300 feet .....	300 feet—0.01 inch.

S. W. STRATTON, Director.

The main feature of this method is that the exact length of the tape is taken each time instead of measuring between several fixed points, and also the great speed with which a line may be gone over, thus reducing to a minimum the variation due to temperature while working. Two of these lines were run in forty-four minutes.

In Mr. Wheeler's method the rear apparatus was arranged with a wooden frame working in a small oak frame which was secured to a stake a few feet in front of the measuring stake for the purpose of placing the 0 of the tapeline exactly over the mark. His front apparatus consisted of a triangular-shaped board resting on two stakes, on which was hinged another triangular-shaped board acting as level to transmit the strain to the tapeline. These arms were kept level and at right angles to the tapeline, respectively, by means of a level tube on the horizontal part of the rear arm and a tangent screw similar to the one on the rear apparatus.

The objection to this front apparatus was that it required a different arrangement of supporting stakes and was slow to adjust, therefore consuming valuable time. To overcome these difficulties a bicycle wheel was substituted for this front apparatus, so that the lower edge of the rim was exactly the same distance to the bearing on the supporting shaft as the distance from the point of attachment of the tapeline on the rear apparatus was from its point of attachment to the supporting stake.

By making the two socket pins the same diameter the front and rear apparatus could be secured in place by placing socket pins in the same sized auger holes, and therefore the line could be run in either direction with the same system of stakes. The main point, however, in favor of the wheel is the rapidity with which it could be placed in position, and also the fact that the screw-and-level apparatus of this end of the line was entirely eliminated and an automatic adjustment provided. The rim of the wheel was dressed level in a lathe and a piece of wood with both edges turned up, secured on it so as to form a groove for the string to be attached to the tape to work in. When not in use this made a convenient storage for the tapeline.

The detail arrangement of the stakes can be seen from the accompanying sketches and photographs. All of these stakes were set with a transit and grades run with a level.

The 1 by 2 inch stakes were driven, but the 3 by 3 inch stakes had to be set with a shovel and the sand packed firmly around them. From East Base to West Base the line was exactly level, excepting the first 300 feet at West Base, where it was necessary to rake the grades down 2.05 feet to reach West Base.

When the stakes were all set and cut off to the proper grade and all the nails driven into the intermediate supporting stakes, as shown in the sketch, this, with the setting of the concrete piers, provided with copper bolts for the terminals of the line, completed the preparatory operations. The method of measurement was as follows: The 0 of the tape was placed exactly over the cross cut in the copper bolt at East Base by means of the wooden screw in the rear apparatus, with the 300-foot mark resting on a 3 by 5 inch zinc plate, tacked on top of stake No. 1, the 10 pound weight being maintained by the lead weight, as shown in sketch. The tape was supported every 25 feet by hooks, hung on nails in the supporting stakes. At each of these stakes was stationed a man, ready to pick up the hook and move ahead at the rear command. When the rear man says "Ready," the man at the front stake makes a mark on the zinc plate exactly even with the 300-foot mark and numbers it and answers "Marked." Two thermometers, hung level with the tape, at one-fourth and two-thirds of its length, are then called out by the men at these points and the commands "Ready" and "March" are then given and the eleven intermediate





MEASUREMENT OF BRUSH LIFE



MEASUREMENT OF BASE LINE AT FORT SCREVEN, GA.





MEASUREMENT OF BASE LINE AT FORT SCREVEN, GA.



men and the two end men pick up the tape and advance 300 feet. This operation is repeated until the monument at East Base is reached. Here it was necessary to measure backward from stake No. 17 to the cross on the copper bolt at the East Base monument. The temperature was taken by two explorers' thermometers, suspended on a level with the tapeline, as stated. The two thermometers used were first tested by the Weather Bureau, at Savannah, to determine their index errors. The readings taken by the Weather Bureau are shown on Table No. 10.

During each measurement no one was allowed to touch the tape with his hands, and great care was exercised not to allow it to touch the sand when moving ahead. All of the men were cautioned not to disturb the stakes and to watch the supporting stakes to see that none of them got out of line. Care was also taken to see that the hooks were all placed on the nails in the same manner and nearly touching the stake. The lines were measured in both directions and in all kinds of weather, in order to determine which condition would give the best results. The measurements taken in bright sunlight are evidently not as good as the others, probably because the temperature recorded by the thermometers was considerably less than the actual temperature of the metal in the tape. Measurement No. 1, taken partly in sunshiny and partly in cloudy weather, seems to be the worst of all, but it is possible there might have been some accidental error in this measurement. It was primarily intended as a drill, for the men were not accustomed to this work. The time at work, being two and one-half hours in this case, is sufficient to throw in many inaccuracies, especially under such unfavorable conditions. Measurement No. 4, taken during a light rain, although not the best, is apparently a good measurement. In all cases when the rear end of the tape was placed at the mark, if the forward end came off of the plate, a "set ahead" or "set back" was made, and the distance between these marks on the plate was measured with steel scale, divided into 100 parts to the inch. The plates were also saved so that these distances could be verified in the office. Magnifying glasses were used to determine the coincidence of the tape marks and the marks on the zinc plates. In order to test the sag in the line for the intermediate points between the supporting stakes, the tape was placed in position with the 10-pound weight attached, the same as used in the work, and level readings were taken at each stake and halfway between them. From this information the catenary was computed for one tape length and the total for the line determined therefrom.

The detail measurement of each line from West Base to East Base is given in Tables Nos. 1 to 8 and the summary in Table No. 9.

The exact cost of this work can not be given, as the men employed on the work were engaged on a survey of the outer bar, Savannah Harbor, at the same time, only working on the base line when they could not work on the bar. As near as I can make out, however, the work cost about \$450. This would have been more if it had been necessary to employ all of the men used as chain carriers. Each day that measurements were taken I got a detail of about 11 men from the commanding officer of Fort Screven. If these men had been employed, including transportation and subsistence, it is likely the work would have cost about \$550.

The accuracy secured in the measurement of this base line is especially gratifying, as it demonstrates that very accurate work can be done with an ordinary surveyor's tapeline at a very moderate cost.

Very respectfully,

A. S. COOPER,  
*Assistant Engineer.*

Lieut. Col. JAMES B. QUINN,  
*Corps of Engineers.*

# REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

## BLE No. 1.—First or drill measurement of base line, East Base to West Base.

Varying from full sunshine to cloudy. Began 9 a. m., finished 11.30 a. m., November, 11, 1904. (Rejected.)

Station.	Thermometers.		Average temperature. <sup>a</sup>	Set back.	Set ahead.	Distance without correction.
	210.	111				
Base .....	61.0	61.5		Inches.	Inches.	Feet.
to 16. ....	64.0	65.5	62.5			276.50
.....	64.0	65.0	62.25			300.00
.....	64.5	63.0	61.50		3.00	300.00
.....	63.0	64.5	61.50		2.00	300.00
.....	64.5	64.5	62.25			300.00
.....	63.5	64.2	61.60			300.00
.....	64.0	63.0	61.25			300.00
.....	61.5	65.5	63.70		9.00	300.00
.....	69.5	69.5	67.25			300.00
.....	67.5	67.0	65.00			300.00
.....	65.5	70.0	65.50			300.00
.....	66.0	66.0	63.70		3.00	300.00
.....	67.0	66.5	64.50		3.00	300.00
.....	66.0	67.2	64.8		2.50	300.00
.....	68.0	70.0	66.7			300.00
.....	67.5	68.0	65.5			300.00
Base .....	67.5	71.0	67.0		4.15	300.00
Average .....			63.88	Total .....	26.65	5,076.50

<sup>a</sup> Average after applying index error.

## TABLE No. 2.—Second measurement of base line, East Base to West Base.

Cloudy, favorable conditions. Began at 2.15 p. m., finished at 2.30 p. m., November 11, 1904.

Station.	Thermometers.		Average temperature. <sup>a</sup>	Set back.	Set ahead.	Distance without correction.
	210.	120.				
Base .....				Inches.	Inches.	Feet.
to 16. ....	70.0	69.5	68.50			276.50
.....	69.5	69.5	67.25			300.00
.....	69.5	69.5	67.25			300.00
.....	69.5	70.0	67.50		3.00	300.00
.....	69.5	69.5	67.25		2.00	300.00
.....	69.0	69.0	66.75			300.00
.....	69.0	69.0	66.75			300.00
.....	69.0	69.0	66.75		8.40	300.00
.....	69.0	69.5	67.00			300.00
.....	69.0	69.5	67.00			300.00
.....	68.5	69.0	66.50			300.00
.....	68.0	68.5	66.00			300.00
.....	68.0	68.0	65.75		3.44	300.00
.....	67.5	68.0	65.50		3.50	300.00
.....	68.0	68.0	65.75		2.00	300.00
.....	68.0	68.0	65.75		2.00	300.00
Base .....	67.5	68.0	65.50		2.38	300.00
Average .....			66.04	Total .....	26.72	5,076.50

<sup>a</sup> Average after applying index error.

TABLE No. 3.—Third measurement of base line, West Base to East Base.

Weather: Cloudy, favorable conditions. Began at 3.30 p. m., finished at 4.30 p. m., November 11, 1904.

Station.	Thermometers.		Average temperature. <sup>a</sup>	Set back.	Set ahead.	Distance without correction.
	210.	120.				
West Base to 1.....	67.5	68.0	65.5	<i>Inches.</i>	<i>Inches.</i>	<i>Feet.</i>
1 to 2.....	67.5	68.0	65.5		2.88	300.00
2 to 3.....	67.5	68.0	65.5		3.00	300.00
3 to 4.....	67.5	68.0	65.5		2.00	300.00
4 to 5.....	67.5	68.0	65.5		2.75	300.00
5 to 6.....	67.5	68.0	65.5		3.50	300.00
6 to 7.....	67.5	68.0	65.5			300.00
7 to 8.....	69.0	69.0	66.75	2.00		300.00
8 to 9.....	69.0	69.0	66.75		1.50	300.00
9 to 10.....	67.0	67.0	64.75		9.00	300.00
10 to 11.....	67.0	67.0	64.75			300.00
11 to 12.....	66.5	67.0	64.50			300.00
12 to 13.....	66.5	67.0	64.50			300.00
13 to 14.....	67.0	67.0	64.75		2.00	300.00
14 to 15.....	67.0	67.0	64.75		3.00	300.00
15 to 16.....	67.0	67.0	64.75			300.00
16 to East Base.....	66.5	67.0	64.50			276.506
17 to East Base.....						23.496
				2.00	29.13	
					2.00	
Average.....			65.22	Total.....	27.13	5,076.506

<sup>a</sup> Average after applying index error.

TABLE No. 4.—Fourth measurement of base line, West Base to East Base.

Weather: Slight rain, apparently unfavorable conditions. Began at 10 a. m., finished at 11.30 a. m., November 12, 1904.

Station.	Thermometer No. 210.	Corrected temperature.	Set back.	Set ahead.	Distance without correction.
West Base to 1.....	59.0	57.0	<i>Inches.</i>	<i>Inches.</i>	<i>Feet.</i>
1 to 2.....	56.5	54.5		2.61	300.00
2 to 3.....	56.5	54.5		3.00	300.00
3 to 4.....	57.0	55.0		2.50	300.00
4 to 5.....	57.5	55.5		3.00	300.00
5 to 6.....	57.5	55.5		3.67	300.00
6 to 7.....	57.3	55.3			300.00
7 to 8.....	57.5	55.5		0.50	300.00
8 to 9.....	57.0	55.0			300.00
9 to 10.....	58.0	56.0		9.00	300.00
10 to 11.....	58.5	56.5			300.00
11 to 12.....	58.0	56.0			300.00
12 to 13.....	57.6	55.6			300.00
13 to 14.....	58.0	56.0		3.00	300.00
14 to 15.....	57.5	55.5		3.50	300.00
15 to 16.....	57.5	55.5			300.00
16 to East Base.....	57.5	55.5			276.529
East Base to 17.....					23.471
Average....		55.56	Total.....	30.78	5,076.529

# REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

TABLE No. 5.—*Fifth measurement of base line, East Base to West Base.*

Bright sunshine, very unfavorable conditions. Began at 3.20 p. m., finished at 4.35 p. m., November 14, 1904. (Rejected.)

Station.	Thermometers.		Average temperature. <sup>a</sup>	Set back.	Set ahead.	Distance without correction.
	210.	120.				
				<i>Inches.</i>	<i>Inches.</i>	<i>Feet.</i>
East Base.....						23.343
to 16.....	63.0	64.0	61.25			276.657
	61.5	63.0	60.00			300.00
	61.5	62.5	59.75			300.00
	63.0	62.5	60.50		2.00	300.00
	62.5	62.0	60.00			300.00
	62.5	63.0	60.50			300.00
	61.5	62.5	59.75			300.00
	62.0	62.5	60.00		11.50	300.00
	62.0	63.0	60.25			300.00
	61.5	62.5	59.75			300.00
	62.0	62.5	60.00			300.00
	60.5	62.0	59.00			300.00
	61.5	62.5	59.75		4.00	300.00
	60.5	62.5	59.25		3.00	300.00
	60.5	62.5	59.25			300.00
	60.0	63.0	59.25		3.00	300.00
West Base.....	58.0	59.5	56.75		4.28	300.00
	Average.....		60.88	Total.....	27.78	5,076.657

<sup>a</sup> Average after applying index error.

TABLE No. 6.—*Sixth measurement of base line, West Base to East Base.*

Fair, sun nearly set, considered favorable. Began at 4.40 p. m., finished at 5.24 p. m., November 14, 1904.

Station.	Thermometers.		Average temperature. <sup>a</sup>	Set back.	Set ahead.	Distance without correction.
	210.	120.				
				<i>Inches.</i>	<i>Inches.</i>	<i>Feet.</i>
West Base.....	57.0	59.5	56.00		4.29	300.00
	59.0	60.0	57.25			300.00
	59.0	59.5	57.00		3.00	300.00
	58.0	59.0	56.25			300.00
	56.5	58.5	55.25		4.00	300.00
	57.0	58.5	55.50		4.00	300.00
	57.0	58.0	56.25			300.00
	57.0	57.5	55.00			300.00
	56.0	57.5	54.50			300.00
	57.0	57.5	55.00		11.00	300.00
	57.0	57.0	54.75			300.00
	56.0	57.0	54.25			300.00
	56.0	56.0	53.75			300.00
	56.0	56.5	54.00		1.00	300.00
	56.0	56.0	53.75		2.00	300.00
	56.0	56.0	53.75			300.00
East Base.....	55.0	55.0	52.75			276.665
to 17.....						23.335
	Average.....		54.94	Total.....	29.29	5,076.665

<sup>a</sup> Average after applying index error.

TABLE No. 7.—*Seventh measurement of base line, East Base to West Base.*

Weather: Bright sunshine, conditions unfavorable. Began at 3.18 p. m., finished at 4.02 p. m., November 15, 1904. (Rejected.)

Station.	Thermometers.		Average temperature. <sup>a</sup>	Set back.	Set ahead.	Distance without correction.
	210.	120.				
17 to East Base.....				<i>Inches.</i>	<i>Inches.</i>	<i>Fect.</i> 23.326
East Base to 16.....	65.0	66.0	63.25			276.674
16 to 15.....	65.0	65.0	62.75			300.00
15 to 14.....	65.5	66.0	63.00			300.00
14 to 13.....	63.0	63.5	61.00		1.50	300.00
13 to 12.....	66.0	65.0	63.25			300.00
12 to 11.....	63.5	64.0	61.5			300.00
11 to 10.....	61.5	63.0	60.0			300.00
10 to 9.....	63.0	64.0	61.25		11.00	300.00
9 to 8.....	61.5	63.0	60.00			300.00
8 to 7.....	63.5	64.0	61.50			300.00
7 to 6.....	65.0	66.0	63.25			300.00
6 to 5.....	63.5	66.0	62.50			300.00
5 to 4.....	65.0	65.5	63.0		4.00	300.00
4 to 3.....	64.7	64.0	62.1		3.00	300.00
3 to 2.....	65.0	67.0	63.75			300.00
2 to 1.....	62.5	64.0	61.00		3.00	300.00
1 to West Base.....	61.5	63.0	60.00		3.67	300.00
Average.....			61.95	Total.....	26.17	5,076.674

<sup>a</sup> Average after applying index error.

TABLE No. 8.—*Eighth measurement of base line, West Base to East Base.*

Weather: Fair, sun nearly set, considered favorable. Began at 4.08 p. m., finished at 4.53 p. m., November 15, 1904.

Station.	Thermometers.		Average temperature. <sup>a</sup>	Set back.	Set ahead.	Distance without correction.
	210.	120.				
West Base to 1.....	61.5	64.0	60.00	<i>Inches.</i>	<i>Inches.</i>	<i>Fect.</i> 300.00
1 to 2.....	63.0	66.0	61.25		3.68	300.00
2 to 3.....	61.0	62.5	59.50		3.25	300.00
3 to 4.....	61.5	64.0	60.00			300.00
4 to 5.....	60.5	61.5	58.75		4.00	300.00
5 to 6.....	62.0	63.5	60.50		3.50	300.00
6 to 7.....	61.0	63.0	59.75			300.00
7 to 8.....	61.5	63.5	60.25			300.00
8 to 9.....	61.0	63.0	59.75			300.00
9 to 10.....	61.0	64.0	60.25		10.50	300.00
10 to 11.....	61.0	64.0	60.25			300.00
11 to 12.....	61.5	62.5	59.75			300.00
12 to 13.....	60.0	61.0	58.25			300.00
13 to 14.....	59.5	60.0	57.50		1.25	300.00
14 to 15.....	59.0	61.0	57.75		2.50	300.00
15 to 16.....	59.0	60.0	57.25			300.00
16 to East Base.....	60.0	60.5	58.00			276.588
East Base to 17.....						23.412
Average.....			59.34	Total.....	28.68	5,076.588

<sup>a</sup> Average after applying index error.



TABLE No. 9.—Summary of base line measurements, East Base to West Base.

Mean temperature.	Set back.	Set ahead.	Index error of tape.	Temperature correction.	Grade correction.	Curvature correction curve = $\frac{d^2}{2R}$ .	Time of work.	Corrected length of base line.	Remarks.
63.94	0.000	2.223	0.014	0.080	0.007	0.076	2 30	5,078.691	Alternate sun and cloudy.
66.94	.000	2.227	.014	.145	.007	.076	1 15	5,078.782	Cloudy.
65.22	.167	2.428	.014	.103	.007	.076	1 00	5,078.787	Do.
56.57	.000	2.565	.014	.208	.007	.076	1 30	5,078.798	Slight rain.
60.98	.000	2.315	.014	.086	.007	.076	1 15	5,078.846	Bright sunshine.
54.94	.000	2.441	.014	.228	.007	.076	0 44	5,078.790	Very little sun, nearly set.
61.95	.000	2.171	.014	.000	.007	.076	0 44	5,078.754	Bright sunshine.
59.34	.000	2.380	.014	.065	.007	.076	0 45	5,078.796	Very little sun, nearly set.

ected.

Mean length = 5,078.7906

Probable error =  $0.6745 \sqrt{\frac{\sum (e - \bar{e})^2}{n(n-1)}} = \pm 0.002$

ortional error of mean = 1 in 2,500,000.

ortional error of 2 or 4 = 1 in 635,000.

TABLE No. 10.—Comparison of thermometers with standard thermometer.

Standard thermometer.	Thermometer No. 210.	Difference.	Thermometer No. 120.	Difference.
62.0	64.0	2.0	64.7	2.7
60.6	62.0	2.4	62.0	2.4
52.6	54.0	1.4	55.0	2.4
67.5	60.0	2.5	60.0	2.5
47.0	49.0	2.0	49.5	2.5
64.5	66.0	1.5	66.0	1.5
60.0	62.0	2.0	62.1	2.1
48.7	50.5	1.8	51.0	2.3
66.5	68.5	2.0	69.0	2.5
59.0	61.0	2.0	61.5	2.5
52.8	54.5	1.8	55.0	2.2
Average...		1.95		2.33
Used as...		2.0		2.5

M M M 7.

## DEFENSES OF GALVESTON, TEXAS.

[Officer in charge, Capt. Edgar Jadwin, Corps of Engineers.]

### FACT FROM SPECIFICATIONS FOR SEA WALL, FORT CROCKETT RESERVATION, GALVESTON, TEX.

renching.—A trench about 16 feet wide at bottom shall be excavated along the line of the sea wall, the bottom to be 1 foot above a low tide, and all material thus excavated shall be deposited back the site of wall as may be directed by the United States agent in charge, but in no case will it be required to be moved over 50 feet, except at battery sites, where it will not exceed 100 feet.

*Piling.*—The proposed sea wall is to be supported on pile foundation, with piles spaced as shown on plans. The piles must be green, with bark on, sound and straight, of either long or short leaf pine, free from decay, large, numerous, or unsound knots; the ends must be square and all branches smoothly trimmed off. The piles shall not vary more than 6 inches from a straight line connecting the ends, and shall not be less than 10 inches or more than 16 inches in diameter 2 feet from the butt, measured under the bark, with a least diameter of 7 inches at the point inside the bark. The piles will be sharpened before driving, and will be driven with hammer and jet until within 2 feet of the final depth, the last 2 feet being driven by hammer alone. If so ordered the piles will be cut off at an elevation of 2 feet above mean low tide, and any pile broomed or split in driving so as not to give a solid cut-off or bearing shall be removed and replaced at the expense of the contractor. All piles shall be driven plumb in the positions shown in plans, have the bark removed from the cut-off to a point 5-10 feet above mean low tide. Piling so driven will be paid for per linear foot below cut-off in completed structure.

*Sheet piling.*—The sheet piling shown on the Gulf side of the sea wall will consist of piling built up of 3 pieces 4 by 12 inches by 24 feet sized  $3\frac{1}{2}$  by  $11\frac{1}{2}$  inches of long or short leaf yellow pine, all pieces to be uniform in width and thickness, and bolted every 4 feet with  $\frac{1}{2}$  by 11-inch screw bolts, countersunk head and nut, with a 9-inch spike driven through tongue, as directed and as shown on plan and cross section. The piling will be driven true and out of wind, with closed joints. Any piles broomed, split, or badly driven shall be removed and replaced at the expense of the contractor. The method of driving will be the same as described for the round piling, and if necessary be cut off at an elevation of 1 foot above mean low tide in a smooth workmanlike manner. The sheet piles shall be sound, free from large or loose knots, shakes, or split ends. The sheet piling will be paid for per 1,000 feet B. M. in completed structure, including all necessary bolts, spikes, etc., to hold the piling in place.

*Broken stone.*—The broken stone for concrete shall be of hard, tough, durable granite, limestone, sandstone, or other equally satisfactory stone, weighing not less than 125 pounds per cubic foot when thoroughly dry. It shall be so crushed that it will pass through a 3-inch ring. It shall be clean and free from dirt, but the particles of hard stone larger than one-fourth inch that come from the crusher shall be retained.

*Sand.*—The sand used in the concrete for the sea wall shall be clean, sharp, fresh water sand, hard and durable, free from dirt, clay, and vegetable matter. Not more than 35 per cent by measure, when dry, shall pass through a No. 50 sieve of 2,500 meshes to the square inch, and not more than 10 per cent by measure shall be retained on a No. 10 sieve of 100 meshes to the square inch.

*Cement.*—The cement shall be a true Portland, dry and free from lumps. By a true Portland cement is meant the product obtained from the heating or calcining up to incipient fusion of intimate mixtures, either natural or artificial, of argillaceous with calcareous substances, the calcined product to contain at least 1.7 times as much of lime, by weight, as of the materials which give the lime its hydraulic properties, and to be finely pulverized after said calcination, and thereafter

additions or substitutions for the purpose only of regulating certain properties of technical importance to be allowable, not to exceed 2 per cent of the calcined product.

*Weights.*—The average weight shall not be less than 375 pounds net per barrel, and 125 pounds net per sack. If the weights, as determined by test weighings, are found to be lower than 375 pounds per barrel or 125 pounds per sack, the cement may be rejected, or the contractor may be required to supply, free of cost to the United States, an additional amount equal to the shortage.

*Tests.*—Tests were made of the fineness, specific gravity, soundness, time of setting, and tensile strength of the cement.

*Reinforcing and anchor rods.*—Corrugated steel bars  $1\frac{1}{4}$  inches square, 10 feet in length, as manufactured by the St. Louis Expanded Metal Company, were placed near the front face of the wall, as shown on plans, at intervals of about 2 feet. Anchor bars  $1\frac{1}{4}$  inches square, 4 feet long, as above specified, will be set in the concrete base in rows, spaced about 3 feet centers, transversely to the wall and about 5-foot centers longitudinally. Also the vertical face of each section of superstructure may be required to be anchored to the adjoining section, in addition to the concrete key, with similar bars placed as directed.

These rods will be paid for per pound in place in completed structure.

*Concrete.*—The concrete shall be composed of the broken stone, sand, and cement heretofore specified. (Batch-mixing machines, of the Smith patent, one 1 yard, one  $\frac{1}{2}$  yard were used.) The ingredients shall be placed in the machine in a dry state and in the volume specified, and thoroughly worked, after which clean water shall be added and the work continued until the wet mixture is thorough and the mass uniform and of such consistency that no tamping is necessary. The mixing shall be done as rapidly as possible and the batch deposited in the work without delay. All concrete shall be mixed in the following proportions:

One barrel of Portland cement, 375 to 380 pounds net;  $11\frac{1}{4}$  cubic feet of clean sharp sand, and 27 cubic feet of broken stone. The cement shall be measured in original packages. The sand and broken stone must be actually measured in bulk. No counting of shovels full or other approximations will be allowed. All concrete shall be mixed in small and convenient quantities and immediately deposited in the work. It shall be laid in horizontal layers, not exceeding 9 inches in thickness. In no case shall concrete be permitted to be placed in the work if it has begun to set. Layers of concrete must not be tapered in wedge-shaped solids, but must be built with square ends. The concrete must be so thoroughly compact that there shall be no pores or open spaces between stones of which it consists that are not thoroughly filled with mortar. The concrete shall be deposited continuously in the work, and all surfaces upon which concrete has to be laid must be wetted and sprinkled with neat cement before the concrete is so deposited. Work, when started on a section of the wall above elevation 4 feet above mean low tide, should be continuous and so performed that no lines of cleavage shall be formed by a portion of the mass setting before an adjacent portion.

After excavation is made, piles and sheet piling driven and cut off at proper elevation, as shown on plans, and the bark removed from the portion of pile to be embedded in the concrete, so that it shall be entirely free from bark and broomed edges, the base of the wall shall

be built continuously and to an elevation 4 feet above mean low water, leaving the two 6-inch by 4-foot recesses in top of base of wall, as shown on plans, and after base shall have set, the upper portion of the wall shall be constructed in sections, alternately, as shown on plans, and when these sections shall have set sufficiently to allow the casings to be removed, the intermediate sections shall be built. Before starting concrete of the sections above elevation 4 feet above mean low water, the top of base of wall shall be thoroughly cleaned and washed off and dusted with neat cement (or otherwise, as may be directed) just in advance of concrete being put in.

The riprap shall be placed in front of the wall, as hereinafter specified, either after pile driving is completed or after pile driving and base of wall are completed. In any case, however, the riprap shall be in place before the wall is carried above elevation 4 feet above mean low tide.

*Molds for concrete.*—Substantial plank shall be provided by the contractor to form the concrete to the exact shapes and dimensions shown on plans, and all surfaces of the forms which come in contact with the concrete shall be thoroughly oiled before the concrete is deposited. They shall be of a substantial character; if made of plank, dressed one side and two edges, and the frames holding them shall be of sufficient strength so that they will be practically unyielding during the process of filling; 2-inch plank supported every 4 feet will be satisfactory.

They shall be so constructed that the inner surfaces of the mold shall be as nearly as possible perfectly smooth, without crevices or offsets, and practically water-tight. When the molds are used more than once they shall be thoroughly cleaned and oiled before using again. The wall shall be finished in a workmanlike manner and to the exact dimensions and elevations shown on plans, care being taken that no pieces of the broken stone shall appear in the finished face. The top of the wall will be floated and troweled. After casings or molds have been removed and wall completed the line of vertical contact between the sections shall be tool pointed, as directed, on the front and back sides of wall. Should there be found on removing the casings or molds any small pits or voids on the exposed surfaces of the wall, such porous places shall be neatly stopped with pointing mortar composed of one part cement and one part sand mixed in small quantities, to be used before it shall commence to set. No plastering of any surfaces will be allowed.

*Riprap protection.*—For a width of 27 feet from the sea face of the wall outward the beach shall be covered with a layer of riprap 3 feet in thickness. The riprap shall be sound, durable, hard, tough stone, weighing, when thoroughly dry, not less than 125 pounds per cubic foot. Not less than 50 per cent of the stone, by weight, shall be in pieces each weighing not less than 200 pounds, and at least 20 per cent shall be in pieces each weighing not less than 1,000 pounds. Stones weighing less than 15 pounds, and dirt, shall be excluded.

RESULTS OF TESTS MADE TO DETERMINE THE STRENGTH OF CONCRETE  
WHEN CEMENT IS MIXED WITH SAND, CLAY, AND LOAM IN VARYING  
PROPORTIONS.

The cement was "Double Anchor" German brand, the sand standard quality; the clay was taken from the cutter of a dredge working in Galveston channel; the loam was heavy black soil from the

mainland. Both loam and clay were thoroughly pulverized, free, apparently, from all vegetable matter and sand and sifted to remove lumps. All briquettes were made from one sample on the same day, under same conditions. The clay acted so unsatisfactorily during the working of the 25 per cent batch that no more briquettes were made for this particular test, but the loam was continued to 40 per cent.

*Tensile strength, test completed August 1, 1904.*

	Old shipment.					
	7 days.			28 days.		
	No. 1.	No. 2.	No. 3.	No. 1.	No. 2.	No. 3.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Sand and cement, 3 to 1 .....	170	185	190	240	240	260
	180	168	191	245	236	265
Sand with 5 per cent loam .....	187			250		
	183			245		
Sand with 10 per cent loam .....		165			241	
		175			250	
Sand with 15 per cent loam .....			203			275
			210			275

*Tensile strength, test completed September 7, 1904.*

	New shipment.			New shipment.	
	7 days.	28 days.		7 days.	28 days.
	<i>Pounds.</i>	<i>Pounds.</i>		<i>Pounds.</i>	<i>Pounds.</i>
Sand and cement, 3 to 1 .....	210	316	Twenty per cent clay .....	184	262
	207	337		189	267
Five per cent clay .....	220	356	Twenty per cent loam .....	220	370
	218	343		216	372
Five per cent loam .....	208	367	Twenty-five per cent clay ...	172	240
	201	359		166	251
Ten per cent clay .....	210	321	Twenty-five per cent loam...	221	373
	213	330		218	375
Ten per cent loam .....	200	369	Thirty per cent loam .....	220	361
	207	365		225	350
Fifteen per cent clay .....	200	296	Thirty-five per cent loam....	205	300
	208	301		198	306
Fifteen per cent loam .....	202	365	Forty per cent loam .....	198	290
	205	368		189	279

*Tensile strength: Test completed November 5, 1904, for 3-month breaks; test completed February 5, 1905, for 6-month breaks.*

	Breaks.			Breaks.	
	3-month.	6-month.		3-month.	6-month.
	<i>Pounds.</i>	<i>Pounds.</i>		<i>Pounds.</i>	<i>Pounds.</i>
Sand and cement, 3 to 1 .....	350	339	Twenty per cent clay .....	250	200
	328	346		258	216
Five per cent clay .....	341	340	Twenty per cent loam .....	250	230
	336	334		241	225
Five per cent loam .....	309	316	Twenty-five per cent clay...	230	175
	321	320		216	160
Ten per cent clay .....	329	327	Twenty-five per cent loam...	239	222
	336	334		243	217
Ten per cent loam .....	320	330	Thirty per cent loam .....	256	210
	329	331		250	216
Fifteen per cent clay .....	270	225	Thirty-five per cent loam....	239	220
	260	220		248	212
Fifteen per cent loam .....	321	319	Forty per cent loam .....	240	198
	328	315		232	213

There remain the 12-month briquettes, which will be broken August 5, 1905,

# SHEET PILING FOR SEA WALL

PROPOSED TO BE BUILT BY  
U.S. ENGR. DEPT. AT GALVESTON, TEX  
AUG 1904

SCALE 1/4"=1'

Top Beveled Sufficient  
to Prevent Drawing



SIDE ELEV.

Pointed for Driving  
in Sand



PLAN

Five Bolts Near Top as Shown  
Then about Every 4 Ft.,  
Bottom Bolt 18" from End.  
Countersunk Head of Bolt  
by Driving in with Maul/  
Bore 2" Hole 1/2" Deep for  
Nut  
No Washers Used  
3 Bolts per Pile

## MATERIAL

Piling to be built up of 3  
pieces 4'-12"-24" sized  
3/8"-11/16" of long or short  
leaf yellow pine, all  
pieces to be uniform in  
width and thickness, bolts  
as shown, by 3/8"-11" bolts,  
countersunk head & nut  
with a 3" spike driven  
through tongue.

END ELEV.

Pointed for Driving  
in Clay

Pile to Be Pointed to Suit  
the Bottom Driven Into

Bottom of Pile to be Left Square,  
at Least Tongue to be Square  
in Order to Clear Groove of  
any Shell or Gravel









SEA WALL, FORT CROCKETT, TEX



SEA WALL, FORT CROCKETT, TEX.



SEA WALL, FORT CROCKETT, TEX.





## MEMORANDUM ON ENGINEERING FEATURES OF FORTIFICATION CONSTRUCTION, INCLUDING PERCOLATION AND CONDENSATION.

The new mortar battery is provided with wide air spaces and copper cover over the top and the front, and side surfaces lined with paper and hollow tiling. This top covering, just completed, has been pumped up by the hydraulic process. So far as we have been able to find, no water leaked through anywhere, not even into the air spaces. The result is considered very satisfactory when compared with that at the old mortar battery, which had a top protection of asphalt. When its filling was pumped up water was in evidence everywhere in the rooms of the battery.

The new 10-inch battery provided with air spaces, copper waterproofing, paper and tiling in front, has developed one leak. The new platforms of the 8-inch battery and other 10-inch battery, which were relaid with copper waterproofing, are believed to have so far shut off leakages directly through them, but there are leaks under them which are known, in part at least, to come from water entering the traverse cover over the magazine and getting under the edges of the platform cover where this runs into the traverse.

Method employed for attacking these leaks has been to pump grout in them both from above and below under high pressure. This method was suggested to me by Captain Hoffman to replace the low pressure and natural flow formerly used, as result of his observation on the Washington Aqueduct. It has been surprising to see the quantities of grout which can be pumped into a hole from which a very small amount of water was coming.

In the top of the middle traverse of old 10-inch battery, grout containing 79 barrels of Portland cement has already been pumped.

The system of taking a daily record of the dampness in each room has been continued. It is found that these records do not show the improvement actually made in the condition of the batteries, for the following reasons: This year's season has been a much more trying one than last; a large amount of water in the grout has been pumped into the concrete, and it takes the surplus some time to dry out; several hard rains have occurred during the period when the covering was off of the loading platform at one of the 10-inch batteries; and we have so far made no distinction, in tabulating, between a room with a small leak or a little condensation and a room with a large amount of water in it.

The system of controlled ventilation has been extended somewhat during the year, giving beneficial results in lessening condensation. The system at the new mortar battery is quite complete. It is working satisfactorily so far, but has not had a test during the bad season of the year since its top cover of sand was in place.

A tracing showing the location of the air passages now being cut in the old mortar battery is forwarded herewith.

Porous brick linings, other things being equal, show less condensation than concrete surfaces.

For further details on the methods used for attacking percolation and condensation, attention is invited to the reports of Superintendents Hinkle and Campbell, herewith; also to the report of the former for a detailed description of the method of pumping up the sand cover for the batteries.

## REPORT OF MR. S. W. CAMPBELL, SUPERINTENDENT.

*Battery for 8-inch guns.*—\* \* \* The method employed to stop the leaks by drilling into ceilings and forcing in grout with a W. & B. Douglas grout pump method greatly increased the condensation but stopped some leaks and others which have since been found to originate in the top cover of magazines.

*Condensation.*—The Gonzales brick lining of the east relocating room and back of No. 2 gun greatly reduced condensation as compared with other parts of the battery; one shell room was lined with them this summer; one ventilator improved by enlarging the 12 by 12 inch air shaft to 20 by 20 inches. The walls and top of battery were coated with linseed oil.

*Battery for 10-inch guns, No. 2.*—The surfacing of loading platforms and were taken up, old work graded to a slope of 1 in 5 feet and 14-ounce sheet laid with rolled and soldered seams; for No. 2 platform the new surfacing with calking seams which were calked with oakum and then filled with water and sand (half and half); the No. 1 platform was relaid without calking seams. This work was just finished this spring, it has not had sufficient tests as yet. Leaks appeared under the copper which have been traced to the top cover of magazines which is now being treated by forcing in grout from the top and then into ceilings and forcing in grout from the bottom. Top of battery and outside coated with linseed oil.

*Condensation.*—Was very bad last winter owing to severe cold and muddy weather, also from pumping grout to stop leakage, but this was discontinued this summer. Air shafts 20 by 20 inches were cut through the top cover of magazines and ventilation and old 3-inch iron pipe ventilators filled with grout; the air shafts reduced condensation.

*Battery for 12-inch mortars, No. 2.*—Outside walls were coated with linseed oil. Leaks stopped by drilling into ceilings and forcing in grout with pump, work proved satisfactory except in one room, where a settlement crack has not entirely stopped as yet.

*Condensation.*—Was very great owing to severe winter, also to forcing in grout. This is being corrected by cutting air passages through walls to gun pits for ventilation.

## REPORT OF MR. W. A. HINKLE, SUPERINTENDENT.

*Battery for 12-inch mortars, No. 1.*—The concrete in this battery was completed except pavements, August 23, 1904. The concrete was put in very wet courses kept as near uniform as possible. The wet concrete makes a very hard work and eliminates the principal cause of leakage. The top surface was finished with neat cement and troweled to a hard finish.

All vertical ventilators have been filled with concrete except those from the air space. All rooms have horizontal ventilators at ceiling level, those connected to air space leading directly into it.

There has never been a drop of water leaked into any of the rooms and magazines from condensation, except very slightly on the iron doors during very wet weather. All magazines and shell rooms are lined with porous brick placed on edge. These brick were placed on edge, giving 4-inch face. This makes it difficult to get in alignment, and some of the liquid of the concrete forced its way through the joints. The face of the brickwork, after forms were taken down, was rubbed to uniform with soft sandstone and the joints pointed with brick dust and Acum in proportion of 1 to 1. This gives same color as brick, makes a good bond and is nearly as porous as the brick; a 24-hours' test of briquette gave 25 per cent. \* \* \*

A small crack has developed in ceiling of gallery in rear of middle magazine. A roof of 14-ounce sheet copper, sheets 3 by 8 feet, was laid on the surface of concrete to prevent water coming in contact with concrete. The sheets were locked one-half inch, hammered flat, and soldered. Before turning over they were tinned for 1½ inches back. These tinned surfaces sweat together under the act of soldering the edges.

The battery has settled an average of 0.6 foot. The rear 0.49 foot, the front 0.6 foot, giving a tip to the front of 0.25 foot.

Terra-cotta wall furring laid in cement mortar is placed on outside of battery. Damp proofing of No. 3 Epure felt is placed against the concrete, which is finished with Epure paint.

The sand parapet has been placed with a centrifugal pump. The plant consists of a small flatboat or barge 24 by 48 by 4 feet depth of hold, one 35 horsepower engine connected to one No. 8 (8-inch suction and 8-

NO. 1. FORT SAN JACINTO. DREDGE AND PIPE LINE FOR PUMPING UP PARAPET OF 12-INCH MORTAR BATTERY.



NO. 2. FORT SAN JACINTO. CONSTRUCTING RETAINING LEVEE OF HAY AND SAND ON TOP OF PARTIAL FILL.







NO 4. FORT SAN JACINTO. HOLLOW TILE FACING FOR PARAPET SIDE OF CONCRETE WALLS.



charge) Morris centrifugal pump; a jet pump is also used to loosen sand around suction. The discharge pipe is made of No. 14 galvanized iron; the sections of pipe are 17 to 18 feet long, these being most convenient to handle. The dredge was put to work about 200 feet from nearest point of delivery. The delivery of sand was begun at 7.5 feet elevation and completed to 32 feet elevation.

About 200 feet of pipe line is on about 12 per cent grade, supported on bents of timber 4 by 4 inches vertical and 2 by 6 inches horizontal. The suction excavates to a depth of about 18 feet, swinging on a radius of the length of the boat. When the supply of sand is exhausted, a bent is put in, the dredge hauled back, a joint of pipe put on, and pumping resumed. Photo No. 1 shows dredge and pipe line, the dredge being 600 feet from the nearest point of delivery. Under favorable conditions and in good material 75 to 100 cubic yards can be delivered per hour. In starting the parapet a mound of sand is thrown up with shovels, the outer slope conforming to the slopes desired, the inner slope being anywhere from 1 on 1 to 1 on 1½; on the inner slope a blanket of loose, coarse hay, grass, or straw about 3 to 4 inches thick is placed, and some sand thrown on to keep in place. This is to prevent water from breaking through. The mound is built up about 3 feet high, or from 2½ to 3½ feet, according to the length of parapet and weather conditions. If there is much wind, do not build so high. Photo No. 2 shows mound being constructed; on corners or any surface exposed to strong winds the hay or other material is spread lightly over outer slope as it is being thrown up with shovels; this prevents the strong winds from hollowing out between the layers of hay on inside. This blanket of hay comes over the mound to the outer slope. The cost of the last work completed (Mortar Battery No. 1) was 18½ cents per cubic yard, including superintendence, train service, etc.

At a convenient place, say the center of parapet, a spillway for water is constructed. This is made of lumber of any convenient dimensions, the area being about four times the area of the discharge pipe for the horizontal portion, which must extend beyond the toe of the slope far enough to not endanger parapet from sand caving in. The vertical part of the spillway is constructed of four pieces of 2 by 4 inches, placed 18 inches apart one way and 4 to 6 feet the other way; across the 18-inch way 2 by 6 inches, 1 by 6 inches, 1 by 12 inches, or any other convenient sizes are nailed; for the sides 2 by 6 inches is the most convenient. When the sand comes up to the top of the 2 by 6 another piece is placed; this keeps the water partly impounded and allows the sand to settle. When the top of parapet is reached the spillway is filled with sand. Photo No. 3 (not published) shows one now in use. Photo No. 4 shows method of placing hollow-tile facing for parapet side of concrete walls.

*Battery for 10-inch guns No. 1.*—The method of construction is the same as at battery for eight 12-inch mortars. In the construction of this battery the gun platforms were constructed first to proper elevation. Then a floor of concrete 12 inches thick was put down and the walls of rooms, galleries, and air space laid off and cased up to 9-foot elevation. When concrete reached this elevation the casing was taken down and sand pumped in to the 8-foot elevation, from which floors were started. Some of the concrete walls are only 2 feet thick and when sand was pumped in were practically green, yet there was no leakage through the concrete. The pumping of sand stopped on a Friday afternoon and on Monday morning was too soft to walk on. Drive-well points were obtained, and put down in the various rooms and galleries, and the whole lot connected up to one piece of pipe and then connected to a steam pump at the power house and the pump kept running night and day until the water was all drawn out of the sand, leaving it hard and in condition for floors. \* \* \*

Copper roofing, same as at battery for 12-inch mortars, was used over all the rooms and magazines. This had a slope of about 5 in 40 feet, the lower edge coming immediately over and to the ceiling of the 2-foot air space, into which any water will drain. Copper was laid over the I-beams of gallery and loading platforms, slightly sloping to air space and to rear. The pavement on top of this was laid in blocks about 4 by 6 feet with the expectation that any cracks which might develop would follow the joint; one crack developed from about 12 feet back to rear edge of platform and came in center of one block and about 1 foot from edge of other; one crack developed longitudinally in loading platform about 40 feet long, but followed the joint of the blocks. Immediately under this there is a leak after a hard rain. Some of the water escapes into the air space. The copper in vicinity of the leak slopes to a ventilator running longitudinally and connecting at each end with air space. The top of the ventilators is on line of ceiling, and it is thought the water not escaping through the concrete to the ventilator dams up and escapes under the copper. No leaks in magazines or shell rooms and no condensation anywhere.

The concrete has settled an average of about 0.27 foot, there being no tip either front or rear. This may be changed when the sand parapet is up.

*Battery for 4.7-inch rapid-fire guns.*—Top and outside of concrete has been treated with boiled oil and the leak which was in the west magazine has been stopped. Ventilators (iron pipe) have been plugged at both ends with wood. The walls and ceilings are damp from condensation during damp or foggy weather. \* \* \*

*Battery for 3-inch rapid-fire guns No. 1.*—No leakage at this battery; outside surfaces treated with boiled oil. Ventilators all plugged with wood; walls and ceilings damp from condensation in foggy or wet weather.

*Mining casemate.*—This is in traverse of battery for 3-inch rapid-fire guns No. 1. The old leak where new concrete of casemate joined old concrete of 15-pounder magazine has been stopped. This was accomplished by cutting a deep groove vertically between the two walls, filling groove from bottom to top of wall with cement plaster, then filling crack on top with boiled oil and Epure paint on top of oil. Ventilators all plugged at top and bottom with wood. Condensation on walls and ceilings in foggy or wet weather.

### MMM 8.

#### DEFENSES OF THE MOUTH OF THE COLUMBIA RIVER.

[Officer in charge, Maj. W. C. Langfitt, Corps of Engineers.]

*Use of hollow blocks.*—Hollow concrete blocks were used as a lining for emplacement rooms to prevent percolation through walls, as shown in accompanying sheet 1. They were also used in powder room at Battery Harvey Allen and in storeroom at Battery Elijah O'Flyng, to ascertain their effect as a preventive of condensation.

As a means of preventing percolation the blocks were laid as shown in section, the back being covered with a waterproof coating composed of two layers of "Ruberoid" roofing felt, cemented together and coated with asphalt pitch. A gutter was formed beneath the bottom layer of blocks, from which any water collecting would be carried to the foundation drainage system.

One advantage of this method over the ordinary method, also shown in sketch, is the saving effected in excavation and back fill. The trench for wall in front of magazines and powder passage was dug only wide enough for the concrete protection required and the concrete laid directly against the bank.

The block used was the "Miracle" patent hollow block, chosen on account of its double air space, which was considered especially valuable where used to prevent percolation. As a lining to lessen condensation in rooms this is probably a disadvantage. As will be seen by reference to a cross section of the block shown in sketch, the web connecting the separate walls is flush with the top and bottom of the block. When laid, therefore, the air spaces are simply narrow spaces from top to bottom of rooms, with no connection except at the gutter underneath. With several types of blocks on the market the connecting webs are not the full rise of the block, and when laid the single air spaces are therefore continuous around the room. This air space could be ventilated, and where condensation was troublesome (which is not the case in this locality) could be used in connection with a false ceiling as a complete lining for the room.

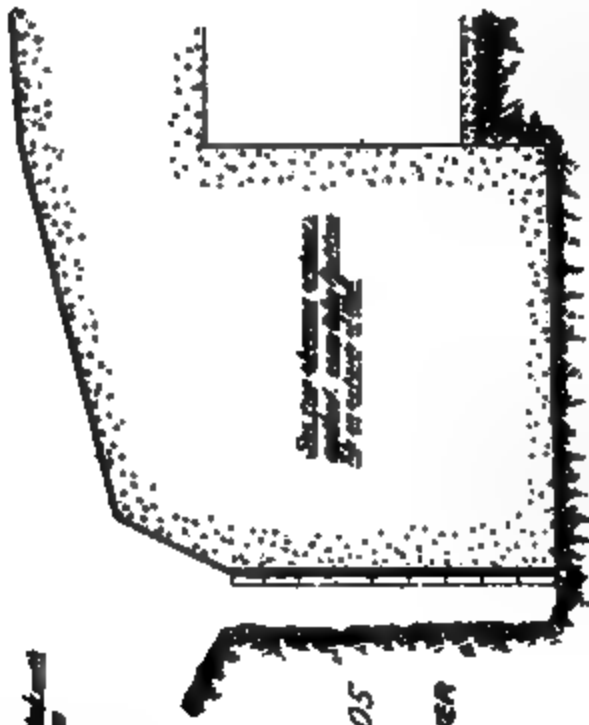
The composition of the blocks made here was a 1 to 5 cement mortar and also a 1-2½-4 concrete mixture, gravel screened through one-half inch mesh. A rather dry mixture must be used, as the molds (but a set of which has been available) are removed as soon as the block



Plan and Section of Fortification  
Facing East

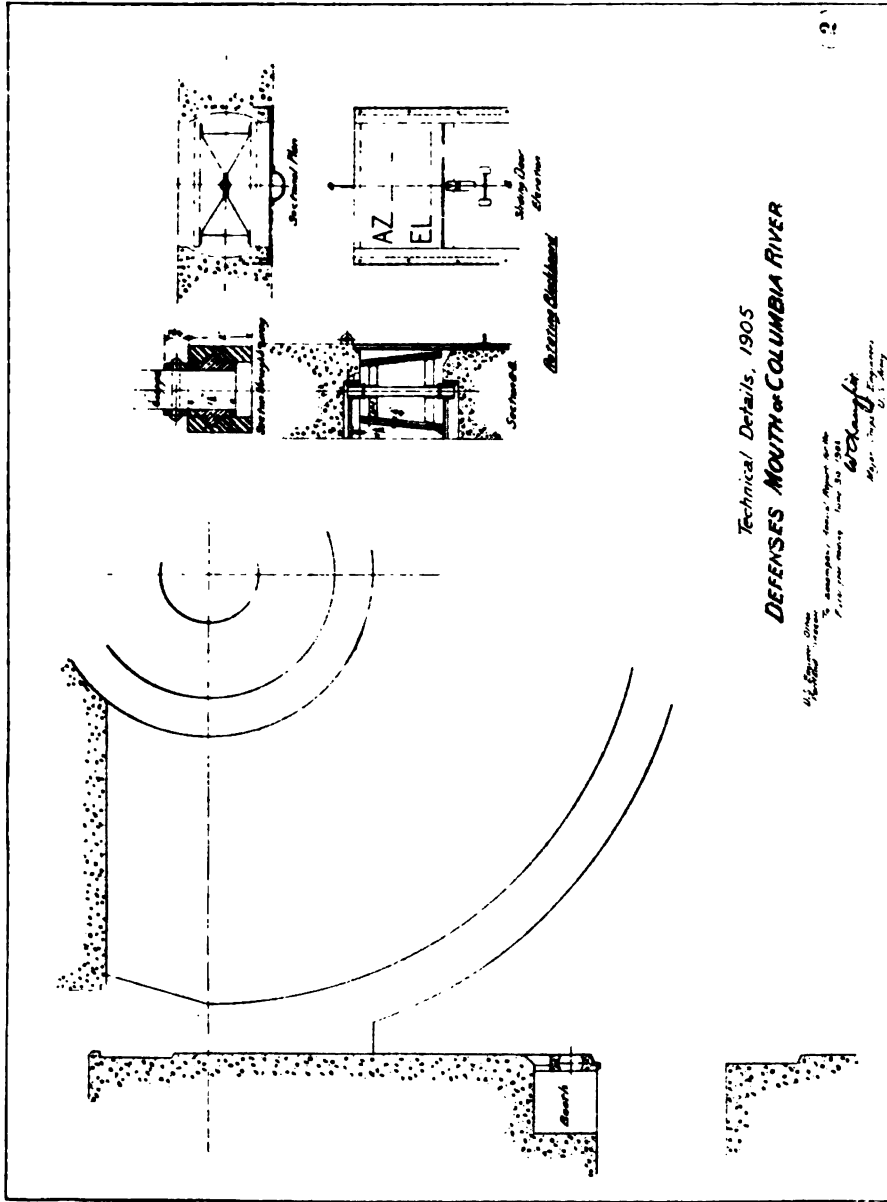
**Initial Details, 1905  
DEFENSES  
WITHIN OF COLUMBIAN RIVER**

General Order  
No. 100  
Approved March 1905  
at 1000 miles from the river  
Washington  
Major (Capt. H. H. H.)



(11)









# Technical Details 1905 **DEFENSES MOUTH OF COLUMBIA RIVER**

U.S. Engineer Office  
 Portland, Oregon

By the Engineer, August 1905  
 After four meetings, June 10, 1905

*W. C. [Signature]*  
 Major, U.S. Army

Section of [unclear]  
 [unclear]





borne off and deposited on its "palette" to set. With the 1 to 5 mortar a barrel of cement made 29 to 30 blocks and the concrete mixture 30 to 35 blocks. The concrete mixture made a very satisfactory block, except that the gravel often showed on the face, one disadvantage of this type of block being that a facing of mortar with concrete body can not be used.

The cores, which are made of wood covered with zinc, gave considerable trouble on account of the zinc becoming loosened and the wood warping. Three men can make 15 blocks per hour and keep it up if space is provided for depositing the newly molded blocks close to the molding bench. These men mix the charge, mold, and bear off the blocks, the materials being brought to the mixing platform by a fourth, who also attends to spraying the blocks as soon as they are old enough to stand it.

*Rotating blackboards in booths.*—Booths were placed in the walls adjacent to the doors to main passage leading to magazines, as shown on sheet No. 2 of accompanying drawings. These were provided with a small window or peep hole, and a rotating blackboard designed by Mr. G. B. Hegardt, United States assistant engineer, to replace the sliding blackboards used in booths recently constructed at mortar batteries. It was found that the sliding boards used warped badly and that rain was blown in at the slide openings during storms. The operation of the rotating blackboard is shown in drawing. A small spring catch engages the board at each  $180^\circ$  of rotation, holding it in position to be read from the loading platform or for writing on the opposite side within the booth.

*Stairways in rear of traverses.*—Details of a reenforced concrete stairway used in rear of traverses are shown on sheet No. 3. Much work on forms would be saved without detriment to the appearance of the stairway if the back of the steps were finished on a continuous plane from top to bottom instead of showing the back of each step.

*Wall hydrants on loading platform.*—On sheet No. 3 is also shown the type of wall hydrant used on loading platforms and the manner of installing them in the walls. For many locations this type of hydrant may be found preferable to the vertical hydrant usually installed in recesses on loading platforms.

*Reinforcement of vertical walls.*—In most of the older batteries horizontal cracks have opened along the faces of the outer walls within a foot or two of the top where the joint of the last layer (or day's work) of concrete was located. These were especially bad where the wall was finished with an overhanging cap. To prevent these cracks all vertical walls, parapets, banquettes, and traverses in new emplacements were reenforced by rods of five-eighths inch diameter medium steel spaced 24 inches apart. The top or finished layer of concrete was also carried through as heavy as possible, not less than 2 feet in any case. A section showing manner of reenforcing traverse wall is shown on sheet No. 3.

*Titles of batteries and numbers of guns.*—The titles of the batteries were formed in rear of traverse walls by means of block letters nailed to forms. The number of each gun was formed in rear of loading platform in the same manner. The letters were made of triangular strips made by ripping diagonally a piece of lumber  $1\frac{1}{4}$  inches square. The letters were  $7\frac{1}{2}$  inches high. The numbers for the guns were 12 inches in height and of correspondingly larger cross section.

The titles are easily read, even with the entire surface of the wall the same color, and can be emphasized as much as desired by a dark paint in incisions of letters. The appearance of the work is good, it is believed that this method will be found preferable to names on wooden signboards where names of batteries are known before construction.

## RIVER AND HARBOR WORKS.

### M M M 9.

DATA AND ILLUSTRATIONS CONCERNING THE OPERATION OF UNITED STATES SNAG BOATS GEN. S. M. MANSFIELD AND CAPT. C. W. HOWELL AND OF UNITED STATES DREDGES GEN. H. M. ROBERT AND GEN. C. COMSTOCK.

[Officer in charge, Capt. Edgar Jadwin, Corps of Engineers.]

UNITED STATES ENGINEER OFFICE,  
Galveston, Tex., July 25, 1905

GENERAL: I have the honor to forward herewith the following technical appendixes to my annual report: \* \* \*

Plans, bill of material, description, and photographs of snag boat *Gen. S. M. Mansfield* and *Capt. C. W. Howell*.

Plans, statement of cost, and photographs of revolving cutter installed on U. S. dredge *Gen. H. M. Robert*. \* \* \*

Memorandum on use of coal and oil as fuel on dredge *Gen. C. Comstock*. \* \* \*

Very respectfully, your obedient servant,

EDGAR JADWIN,  
Captain, Corps of Engineers

Brig. Gen. A. MACKENZIE,  
Chief of Engineers, U. S. A.

## (A) CONSTRUCTION AND OPERATION OF SNAG BOATS GEN. S. M. MANSFIELD AND CAPT. C. W. HOWELL.

[Report of Mr. Chas. Schuster, superintendent.]

GALVESTON, TEX., July 14, 1905

CAPTAIN: I have the honor to submit the following report on construction and operation of the snag boats *Gen. S. M. Mansfield* and *Capt. C. W. Howell*:

\* \* \* Both boats were built alike, with the exception of a few details. \* \* \*

The dimensions are: Length of hull, 106 feet; length over all, 120 feet; beam over all, 26 feet; depth of hold amidships, 5 feet; sheer aft, 6 inches; forward, 12 inches; crown in deck and bottom, 8 inches draft, with coal and water, 2 feet 8 inches.

The boat has stern-wheel engines of 12-inch bore and 48-inch stroke, balanced piston valves, wooden pitmans, 6-inch wheel shaft, stern wheel 18 feet diameter and 18 feet wide, with floats 18 inches wide, separate feed-water heater, duplex feed pump with 5-inch plungers.







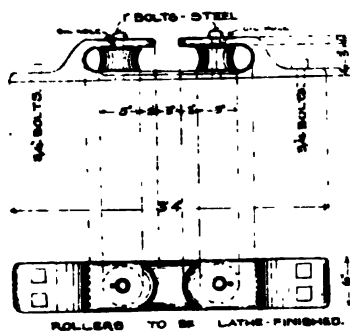
5 Army with 100

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is U.S. Army



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C.I. CHOCKS FOR SNAG-BOAT  
FOUR WANTED.

## BRAZOS RIVERS, TEXAS.

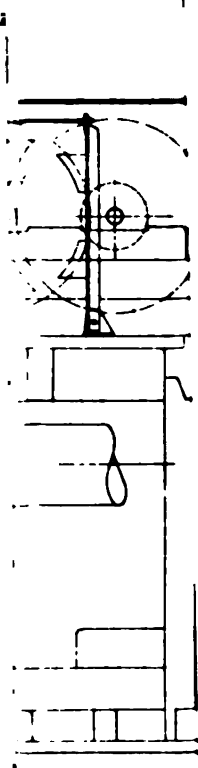
FOR SNAG-BOAT DERRICK, ETC.  
UNDER THE DIRECTION OF  
AR JADWIN, CORPS ENGRS U.S. ARMY.  
SCALE -  $\frac{1}{2}$ " = 1'

D.A. WAT T, ASST. ENGR.

504.  
Supt.

U.S. GOVERNMENT









SNAGBOAT GEN. S. M. MANSFIELD.

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**SNAGBOAT GEN. S. M. MANSFIELD.**



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DREDGE GEN. H. M. ROBERT.



DREDGE GEN. H. M. ROBERT.



duplex steam fire pumps and 3 siphons of 2½ inches diameter in hold. The boilers are of the standard "Mississippi" type, of 50 horsepower each, tubular and externally fired, and carry 175 pounds per square inch working pressure. The hoisting engine is a double-cylinder, three-drum Lidgerwood, cylinders 10 by 12 inches, with three winch heads.

Because of the extreme heat during the summer on the inland rivers here the forward machinery and boilers were not housed in. Dining room, kitchen, and storeroom are on the main deck, and sleeping quarters and office are upstairs.

While the full working crew consists of 15 men, the boat is furnished with quarters for 30 men, besides officers' room, office, and pilot house, so that an extra working party can be carried if needed.

A full crew consists of 1 master at \$100 per month, 1 steam engineer at \$85, 1 engineman at \$60, 1 fireman at \$50, 1 mate at \$70, 1 deck t \$40, 6 deck hands at \$35, 1 cook at \$50, 1 waiter at \$25, and 1 keeper at \$65. All the employees are subsisted by the United

States. When the boat is working at snagging or dredging only one boiler is kept up under steam and about 2 cords of wood or 1½ tons of coal are consumed per day. When running in open water the consumption of fuel of both boilers is about 6½ cords per day's run. The top speed of the boat is 4 miles per hour in slack water. The cost of keeping the boat in commission is about \$1,250 per month, including fuel, all supplies, and minor repairs.

The cost of construction was as follows:

Hull .....	\$5,200.00
House and rigging .....	2,635.63
Stern-wheel engines .....	3,450.00
Boilers .....	3,220.00
Hoisting engine .....	1,722.00
Installing machinery .....	1,418.00
Painting and finishing .....	1,000.00
Total .....	18,645.63

The boats can be used for towing, snagging, hydraulic grading, dredging, surveying, and for headquarters for detached parties. The boats also condense all drinking water for their own crews and other which have no steam. The *Capt. C. W. Howell* is equipped with a 2 cubic yard Hayward orange-peel dredge bucket for dredging clay. The *Gen. S. M. Mansfield* has a 1½ cubic yard orange-peel bucket for dredging in shell and mud, and have done good work in dredging.

Very respectfully, your obedient servant,

CHAS. SCHUSTER,  
Superintendent.

EDGAR JADWIN,  
Corps of Engineers.

(B) PLANS AND STATEMENT OF COST OF REVOLVING CUTTER INSTALLED  
ON UNITED STATES DREDGE GEN. H. M. ROBERT.

[See illustrations opposite.]

(C) MEMORANDUM ON USE OF COAL AND OIL AS FUEL ON DREDGE GEN.  
C. B. COMSTOCK.

[By G. M. Prendergast, master.]

I have the honor to submit the following comparison of cost of fuel used by dredge *Gen. C. B. Comstock* per cubic yard of material dredged, for single and double crew, when dredge was operating under coal and oil. In the case of the dredge operating under coal with double crew only seven months were ever worked where coal was used for fuel and double crew was aboard.

*Cost of 1 ton of steam coal (single crew).*

Average cost per ton as per contract .....	\$5.50
Loading coal .....	.30
Extra stokers (single crew), at \$1.50 and \$1.33 per day .....	.07
Cost of crew's salary, which is lost when coaling (twelve hours), \$45.68 .....	1.02
Cost of 1 ton .....	6.89

*Cost of 1 ton steam coal (double crew).*

Average cost per ton as per contract .....	\$5.50
Loading coal .....	.30
1 extra stoker (double crew), at \$1.33 .....	.03
Cost of crew's salary, which is lost when coaling, \$70.81 .....	1.574
Cost of 1 ton .....	7.404

*Single crew, coal and oil.*

Coal, one year, from December, 1900, to November, 1901:	
Used 1,170 tons coal, at \$6.89 per ton .....	\$8,061.30
Dredged .....	526,910.4
Cost per cubic yard, \$0.0153 .....	1.53
Oil, one year, from January, 1903, to December, 1903:	
Used 7,814 barrels fuel oil, at \$0.881 per barrel (average cost) .....	\$6,886.20
Dredged .....	592,589.0
Cost per cubic yard, \$0.01162 .....	1.1620
Coal, from March, 1897, to February, 1898 (seven months' work):	
1,694 tons coal, at \$7.404 per ton .....	\$12,542.38
Dredged .....	975,287.9
Cost per cubic yard, \$0.01286 .....	1.286
Oil, one year, from July, 1904, to June, 1905:	
Used 12,356 barrels fuel oil, at \$0.6540 per barrel (average cost) ...	\$8,082.93
Dredged .....	1,091,640.5
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